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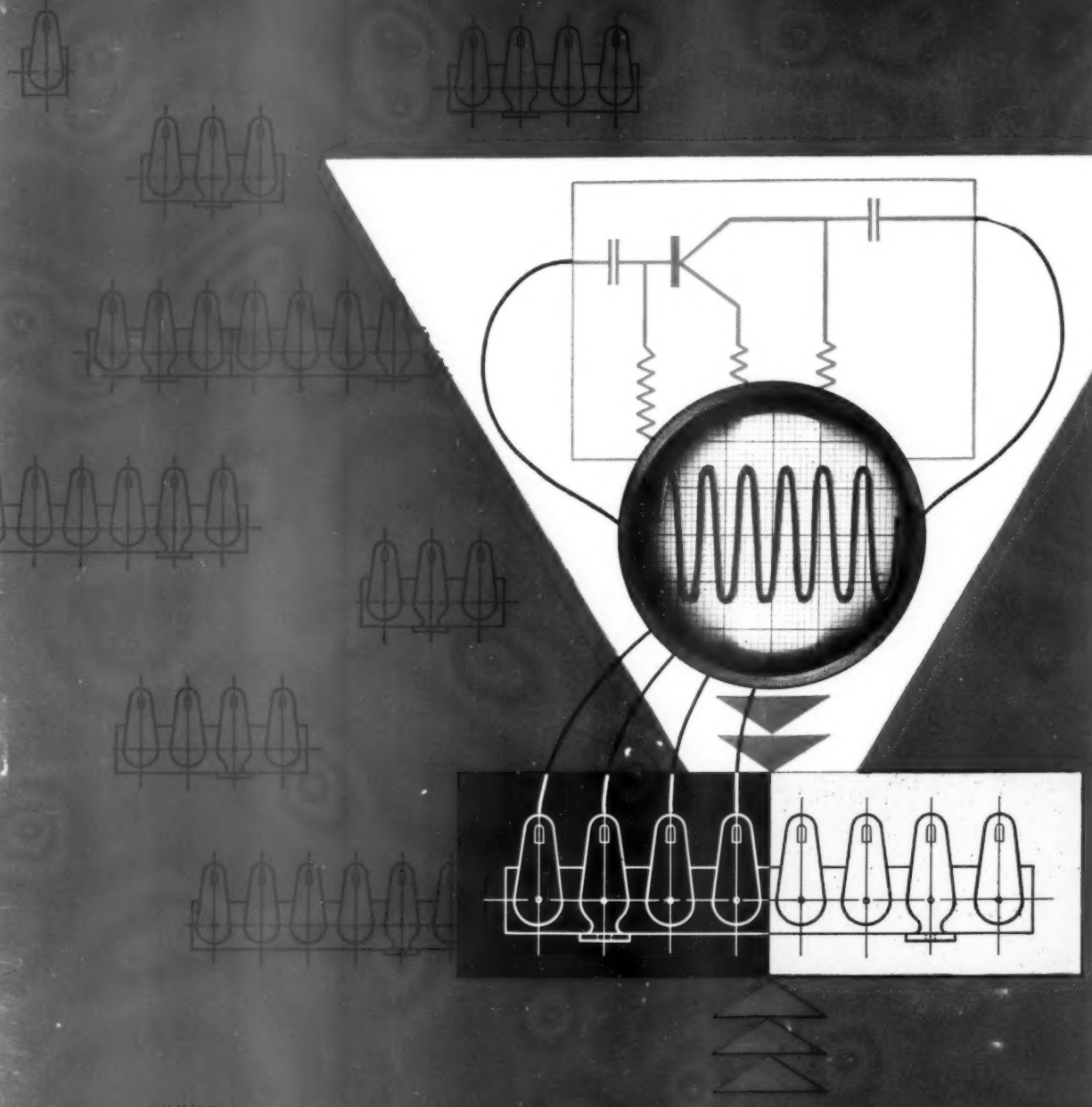
assembly & fastener ENGINEERING



DECEMBER • 1958

In this issue: **Welding Assembly Tabs to Vinyl-Metal**
Standardization Aids Research at RCA
The Tensile Area of Threads

Click . . . click . . . quick

This man is solving a fastener problem

the Pheoll *way!*

The ability of the Pheoll production supervisor to deliver on schedule adds an important *plus* to the work of other members of the Pheoll "specials" team. Their willingness to *TRY* for effective solutions to tough fastener problems generally results in the *right* answer, at the *right price! His* knowledge of production and sound expediting techniques adds the extra advantage of delivery at the *RIGHT TIME!* Why not get all three—*the right answer, at the right price and right time*—on your next fastener problem? Simply call the Pheoll field representative . . . he'll get you started to a *fast* solution.

Incidentally, the man in the photograph *is* a Pheoll production supervisor . . . George Sterba, veteran of 30 years in all phases of fastener production at Pheoll.

Pheoll Manufacturing Company
Industrial Fastener Division
5700 WEST ROOSEVELT ROAD
CHICAGO 50, ILLINOIS

assembly & fastener ENGINEERING

December, 1958 Volume 1, Number 3

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Standardization Cuts Costs at RCA 26
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• Tie-point terminal boards by the thousands are used by product engineers in "breadboard" work at RCA. How standardization helped cut costs on these terminal boards is described in article starting on page 26.

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RB&W FASTENER BRIEFS

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Technical-ities

By John S. Davey

The strength of nuts

With a hard, heat treated nut, ability to plastically adjust and distribute load over many threads diminishes. High loads tend to concentrate on first thread severely enough to cause stripping . . . or fracture of first thread, which causes locking. Nut then cannot increase tension in bolt.

Untreated nuts are strong enough for most needs, and don't pose this problem.

A CAUSE OF STRIPPING

Upon tightening, a nut both compresses and dilates. Dilation can be overcome by wall thickness only, not by added height or heat treatment.

Dilation is important since a reduction in area of bolt under tension accompanies it. Threads pull away from each other, from their stronger base to weaker tips. The shallowness of *fine* threads can cause progressive shear.

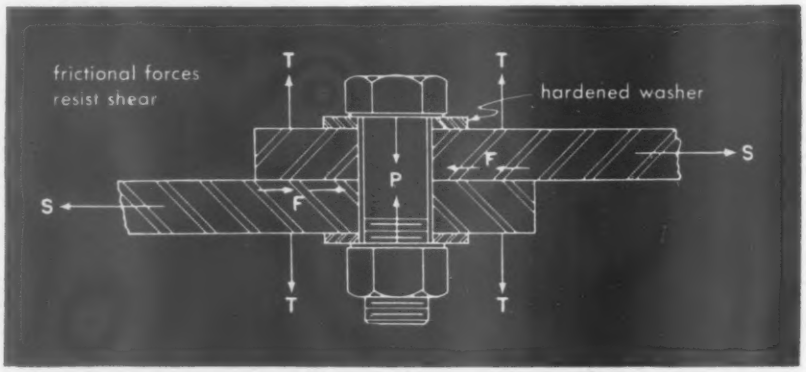
That's why High Nuts (with fine threads) are no answer where "Heavy" Nuts (with coarse threads) are.

WRENCHING STRESS HIGHEST

Rotation of nut produces both tension and torsion in bolt. The force applying this combined stress is about 20% greater than the load which must be sustained when rotation stops.

Thus . . . if a nut hasn't failed in wrenching, it can still withstand at least 20% more direct pull than it sustained during the tightening.

Why high strength bolts make superior joint for dynamic loads



Washers prevent crushing under head and nut with consequent grip relaxation.

While fasteners must be strong enough to carry the calculated loads, what makes a *joint* truly strong is the *residual tension* after wrenching.

NO SLIP OR SEPARATION

Consider the simple lap joint in sketch. Practically rigid, this joint is subjected only to: (1) external tension forces "T" tending to separate the plates against bolt clamping force "P"; (2) shear forces "S" tending to make plates slip against friction resistance "F".

"F" increases when "P" does. With enough clamping force applied, shear loads transfer from one plate to the other without slippage. And when clamping force always exceeds tensile forces, plates obviously *cannot* separate. There can be no further stretch on bolt. Its load stays static at preload "P", even when external loads are dynamic.

UNIFORM CONTROL OF PERFORMANCE

RB&W high strength bolts allow a high magnitude of clamping force to be applied . . . and *uniformly* so. Materials conform to ASTM specifications. Applying known torques to nut produces uniform bolt tensions. Riveting by contrast, depends on difficult-to-control variables.

MORE STRENGTH OVERALL

For shear-resistance, riveted joints offer only the actual rivet shear strength. Don't count too much on friction even though rivets exert some grip as they cool. Compare: a 1-inch bolt tightens to a tension of 42,000 lbs; a 1-inch rivet develops 22,000 lbs at best.

The higher residual tension does more than make a joint much stronger in shear and in tension. It also protects the bolt against fatigue caused by stress-reversing cycles such as vibration; keeps the bolt from loosening, too.

All this explains why, under heavy dynamic loads, rivets can loosen, elongate holes, often fail, requiring difficult replacement; but high strength bolts stand up. They can keep connections permanently tight on vibrating machinery, heavy duty conveyors, and transportation equipment.

Talk it over with an RB&W fastener expert. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W high strength bolts are from selected grade of medium carbon steel with proper combination of ductility and tensile strength; conform to ASTM A325.

Plants at: Port Chester, N.Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco.

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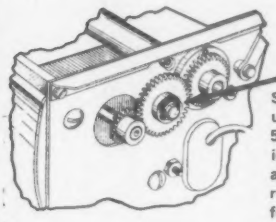
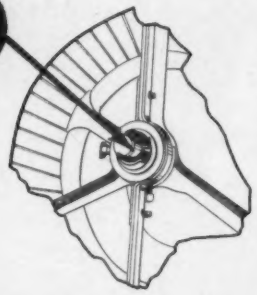
Truarc Rings Eliminate Parts and Machining, Speed Assembly, Reduce Manufacturing Costs

Ring eliminates nut and threading, saves $365/M

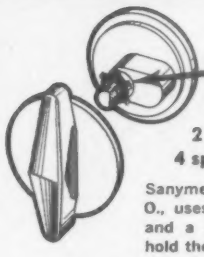


Sanborn Co., Waltham, Mass., uses a Waldes Truarc Series 5555 Grip ring* to secure the idler gear assembly of its portable electrocardiograph. The ring assures faultless gear performance necessary for diagnostic accuracy, eliminates a nut and threading operation for savings of $365 per 1000 units.

Ring saves parts, speeds assembly for savings of $260/M



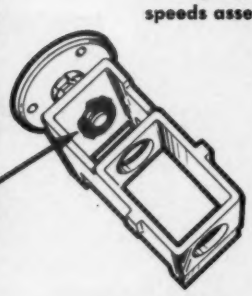
Fraser and Johnston Co., San Francisco, Calif., uses a Series 5555 Grip ring* to secure the fan shaft and speed assembly of its furnace blowers. The ring eliminates a collar and set screw for savings of $180/M on materials, $80/M on assembly time—a total of $260 per 1000 units.



2 standard rings replace 4 special parts, save $170/M

Sanymetal Products Co., Inc., Cleveland, O., uses a Series 5005 Self-locking ring and a Series 5103 Crescent® ring* to hold the escutcheon plate and handle of this doorlatch for toilet compartments. The two standard rings replace four expensive chrome-plated brass parts for savings of $170 per 1000 units.

Ring replaces spring and washer; speeds assembly 50%, saves $15/M



Allen-Bradley Co., Milwaukee, Wisc., uses a Series 5139 Prong-Lock ring* to secure the adjustment knob of its pneumatic timer. Ring eliminates a costly coil spring and washer, simplifies a tough assembly operation. Cost saving: $15 per 1000 units. Assembly time saving: 50%.

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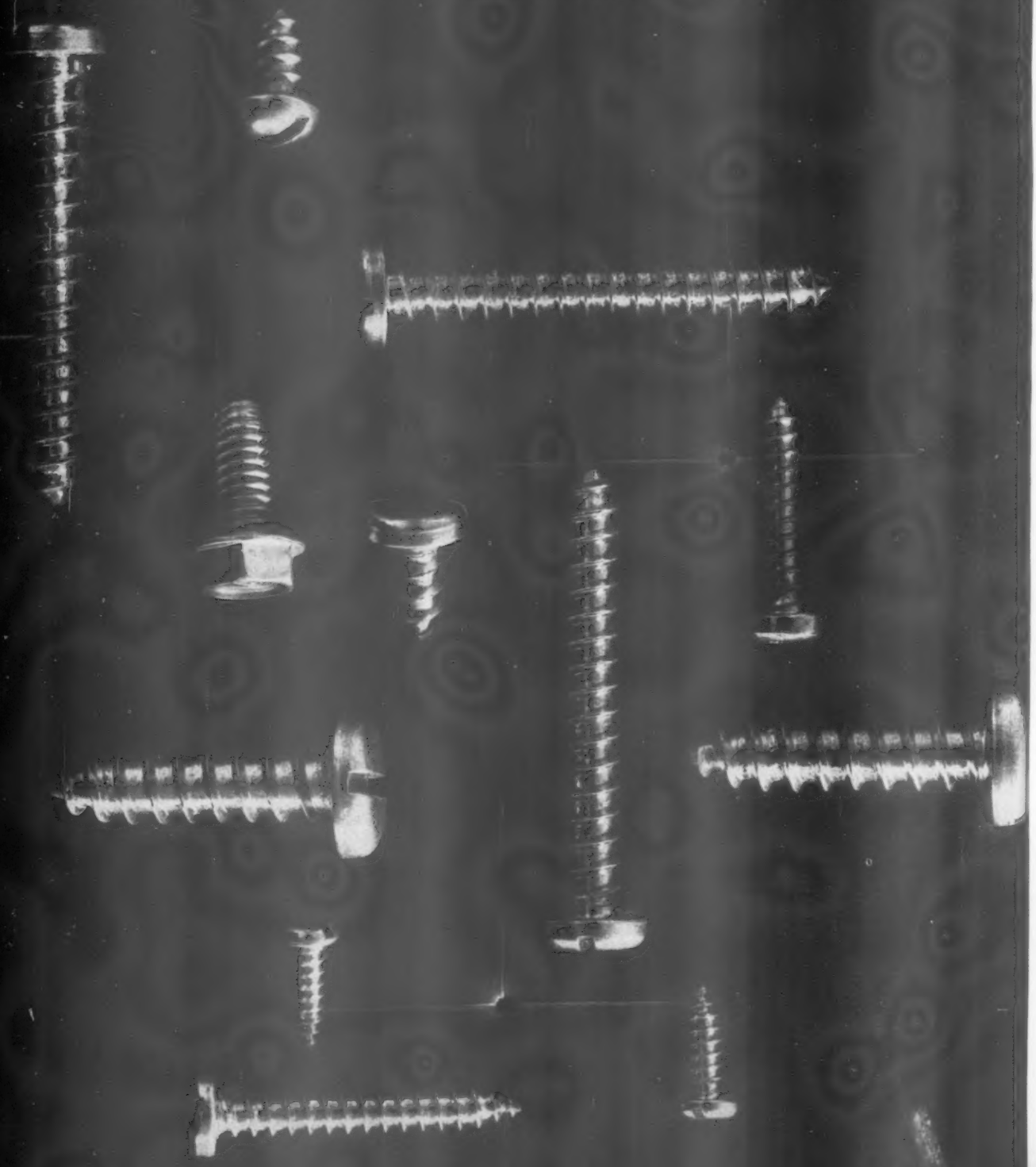


THE EDITOR'S VIEW

DECEMBER, 1958 VOL. 1, NO. 3

STANDARDIZATION—A CHALLENGE TO INGENUITY

Standardization has a different meaning to different people. To the unimaginative, it means that he can close his mind to what he considers a painful process—creative thinking. But to another, it's a challenge to his ingenuity—a challenge to improve, even within specified limits.

No where can standardization be more beneficial than in our mass-production industries. The yearly and seasonal model changes bring new specifications which only compound the burden of existing specifications, adding to the hundreds of types, styles and sizes of parts previously accepted as standard.

It is here where ingenuity can come up with basic stock parts which can be adapted to a wide variety of uses, eliminating much overlapping and duplication.

An example of this is described in a feature article in this issue. It is concerned with two entirely different types of fasteners used in thousands of applications at the Radio Corporation of America.

One is the tie-point terminal board used extensively by product engineers in "breadboard" work. Their engineering stockroom found it increasingly difficult to stock all the various types of boards listed in RCA standard books.

A little research discovered that nearly two-thirds of some 300 types of terminal boards could be adapted from one stock item with the aid of a hacksaw or a pair of side-cutters. Though many of these "adaptations" were acceptable only for prototype work, some 18 were found perfectly acceptable for use in finished products.

The other example is concerned with pan-head machine screws. RCA found that standardization on this screw eliminated or greatly reduced usage of at least five styles of screws used in sizes of .250 inches and under. This helped simplify assembly operations because standard screw drivers could be used in many more places.

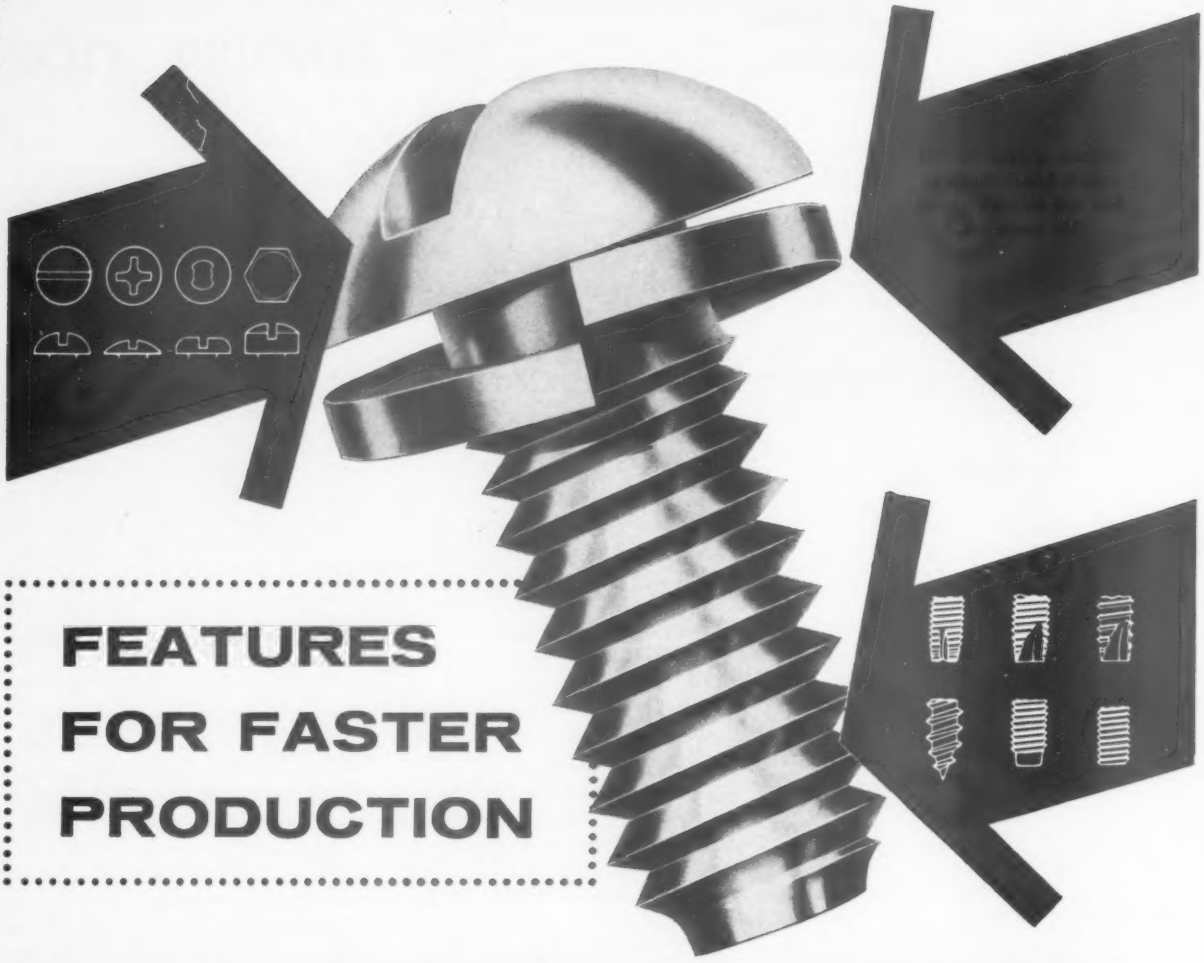
But less obvious benefits also accrue from standardization. For one thing, the amount of paper work is sharply reduced. Requisition orders, receiving reports and stock reports are fewer and for larger quantities, and at lower prices.

These two examples show that the benefits of standardization can be company-wide—from purchasing, on through engineering and production. They help prove that while standardization is necessarily limiting in nature, these very limits help focus attention where needed.

Matt E. Haverty

Managing Editor

THE BEST INDUSTRIAL FASTENER FOR THE MONEY



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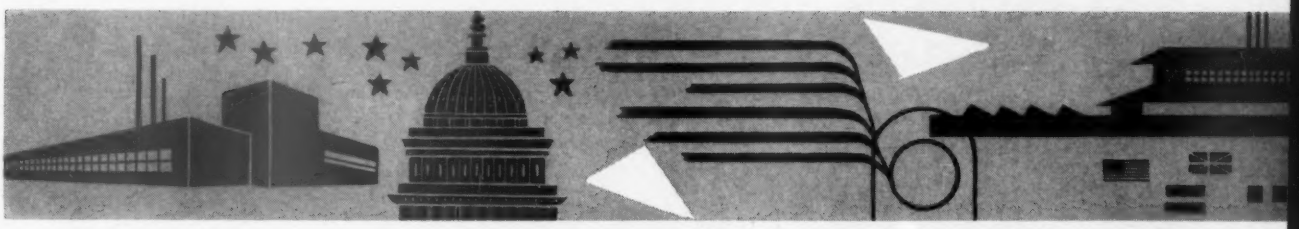
The State of Business



Trans-Atlantic and continental flights herald the arrival of commercial jet air transportation. But Americans, who make 50 million flights a year, won't feel the full impact of this milestone until sleek Boeing 707's are making shorter runs regularly, still nine months away. The public is welcoming the promise of speed, ease and efficency, (4½ hours from Los Angeles to New York) even while wondering how much of the immense cost of re-equipping air fleets and airport modernization will be passed on in increased fares.

It's too late now to check this revolution, even if one wanted to, which by 1962 will mothball the piston plane commercially.

Labor troubles slowed the recession recovery rate in November but could not stop the steady climb back to pre-September '57 optimism. Increased new orders— up from a September low in inventories— production, construction, employment and income combined to move GNP pace to $450 billion yearly, topping the third quarter 1957 crest of $445.6 billion. The final 1958 figure should exceed $440 billion.

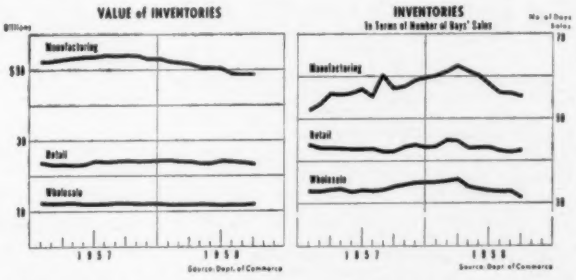
Strike setbacks, which kept auto builders from meeting dealer demands for '57 models, are being overcome with weekly production schedules of 140,000, about par for this time of year. Inventories are over 400,000 now. Total assemblies this year through late November are 3,561,000 compared to 5,465,000 in a similar '57 period. A minority of government economists see as the only cloud on the 1959 industrial horizon, a "lacklustre" auto year. Output is currently outstripping sales 3-2.

Auto dealers reported an average operating loss of $6 on each car or truck sold through the first nine months of '58, according to a NADA survey. However, 58% were operating in the "black."

Ford plans 45% of its December output to six Galaxie models, all resembling the Thunderbird in styling. Base prices for the new line—excluding extras, taxes, handling—start at $2300.

Fastener industry officials beamed when American Steel & Wire disclosed that its Cuyahoga, Ohio, rod mills smashed all records during October with 39,511 tons or 501 tons per eight-hour turn. This is some 9000 tons more than the known previous high. Orders for 53 rod sizes were demanded by users, says plant manager Walter L. Longnecker.

However, the steel industry in general feels that the current 75% of rated output is going to be tops for '58 because of strike-disrupted schedules.



Manufacturers have sharply reduced inventories in the past 12 months, September stocks far below the March level.

Christmas? Artificial evergreens with stainless steel limbs are selling briskly from $27 for a table model to $150 for an eight footer. Optional equipment includes a revolving stand which plays Jingle Bells. The holiday rush seems to be starting earlier every season with some stores decked in yule trimmings by mid-November. One Chicago merchant captured headlines by stacking his first load of trees (genuine) three weeks before Thanksgiving.

International Harvester and the UAW remain deadlocked over many of the issues which forced the historic 35-day walkout in 1955: grievance procedure, arbitration, health and welfare, unemployment pay. Meanwhile, 37,500 workers wait. Caterpillar has been out for two months while John Deere, making farm equipment while the "sun shines," settled for terms which some union officials call "the best we have ever negotiated."

continued

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Capital Airline's agreement with its mechanics after a 39-day strike for a 42-cent package to be spread over three years is apparently the standard for other airline bargaining. Northwest granted 41-cents the following day. TWA and Lake Central are facing union demands.

Watch for; stockpiling of inventories during the first half of 1959 to meet expected labor crisis when three-year contracts expire on June 30.

Home laundry appliance sales in October were the highest in two years, reported the manufacturers' association. Total sales were 607,304 units while gas dryers (65,272) and combination washer-dryers (22,843) set all-time highs.

Statistics from the National Electrical Manufacturers' Association show that major household electrical appliances have moved faster than last year in everything but refrigerators. Hotpoint, incidentally, will discontinue its TV line Dec. 31 to concentrate on appliances.

Freight carloadings, longtime barometer, for the first two weeks of November over 1,200,000, represented a fast start towards the lowest percentage of decrease (5%) for any month this year compared to 1957. Three year comparisons are, roughly: 1956—32,265,000; 1957—30,770,000; 1958—about 29,000,000. Just a slump; or a trend?

Executives in five of eight leading department stores in New York City, Chicago, San Francisco and Dallas expect 1958's final quarter to put their total year sales to equal the 1957 level. One expects sales to equal 1957, two do not think the recession effect will be counterbalanced this soon.

Farm land prices were boosted a record 5% this year by additional demand, confirms the Department of Agriculture. With pressure for larger acreages to hold down production costs per unit, owner-operators have been the dominant class of buyers. And farmers have been unable to restrict their purchases to unimproved tracts, but have been forced to buy complete farms. Sharpest land price increases have been in Florida, 15%; Nebraska, 10%; Maryland, 9%. Lowest in Pennsylvania and Iowa, 3%.

Increased FHA and VA housing starts account for the rise in homebuilding this year.

Notes in the News: The Patent Office is speeding up its processing routines, thanks to more employees. The average "patent pending" time is still over three years, but the Office is aiming for the one year level . . . Construction has been completed on 2266 miles of the 41,000-mile interstate highway system authorized by Congress two years ago . . . Uncle Sam is out to recruit brilliant college graduates for Government agencies. A Controller General's decision will permit more supergrades paying from $14,190 to $17,500 annually . . . Business concerns contributed $7,695,000 to more than 400 liberal arts colleges in 1957 . . . More older women are going to work. Labor Department says highest proportion of 22 million salaried women is now between the ages of 45 and 54 . . . Builders say they will erect 1.1 million housing units this year but, unless mortgage money loosens (and it seems unlikely), they won't do as well in 1959 . . . One-fifth of the nation's output of goods and services now represents the activities of Federal, State and local governments.

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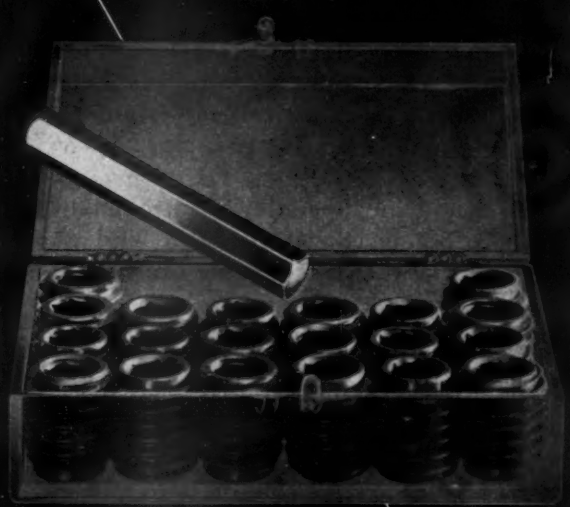

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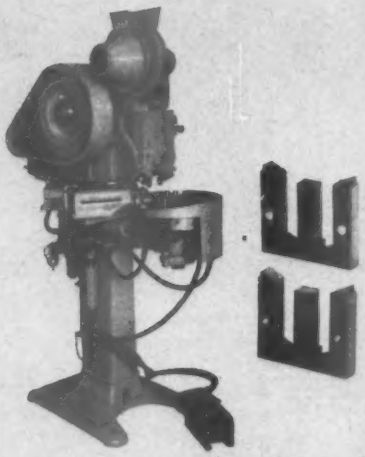

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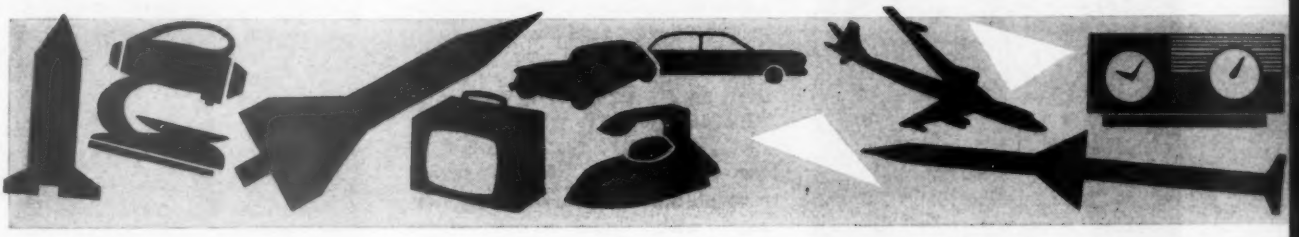
Industry at Work



ROTATING DUCT PROPELLERS ALLOW DOAK 16 TO PLAY HELICOPTER

It's no mistake, Californians are seeing a fully covered airplane behaving like a helicopter.

The U.S. Army Transportation Research and Engineering Command's revolutionary Doak 16 VTOL (Vertical Takeoff and Land) research vehicle has completed its ground and hovering test programs at the Doak Aircraft Company in Torrance and is now making transition flights at the National Aeronautics and Space Administration High Speed Flight Station at Edwards Air Force Base.

With ducted propellers on wing-tips aimed straight up, the novel aircraft will rise vertically (as in photo), then slowly rotate ducts forward in transition to horizontal flight, then rotate ducts back and land vertically. The entire airplane will maintain conventional horizontal attitude at all times. It is powered by an 825 hp Lycoming T53 shaft turbine engine.

Once in the air, Doak 16 will operate as a conventional airplane with more speed and longer range than helicopters. Where airports are available, it will also take off and land horizontally.

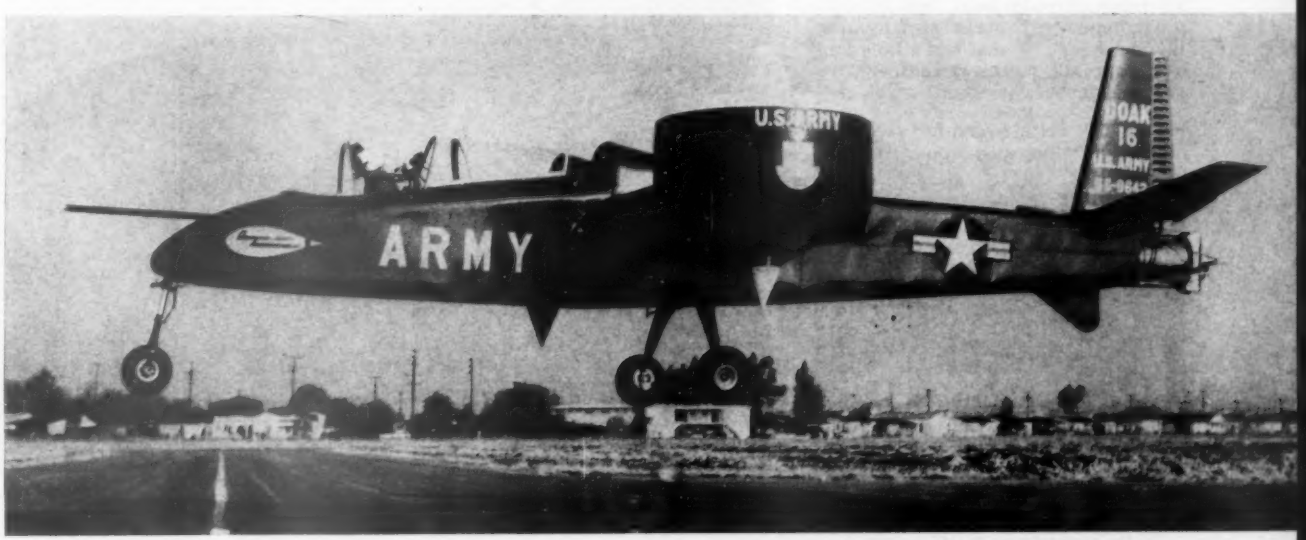
After transition flights, the fully-covered craft will move into normal airplane category, where higher speeds will be studied. Although the Army requires this type of airplane for observation, liaison and rescue missions, commercial possibilities lie in a feeder line service between places with small airfields or none at all and major city airports serving the huge new jet airliners.

MACHINE ARC WELDS 85 FEET AT A TIME

The largest automatic submerged arc welding machine ever developed for a single operation, designed for the fabrication of 85-foot flat cars for use in railroad piggy-back service, has been completed at the Butler, Pa., freight car plant of Pullman-Standard Car Mfg. Co.

The 30-ton unit, with its extending jig 385′ in

continued



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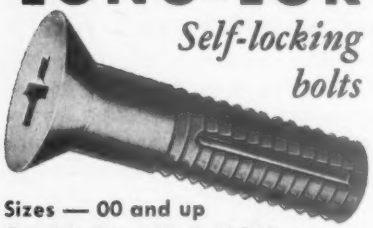
Self-locking bolts



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Qualified to MIL-F-18240

Long-Lok self-locking elements for all male threads hold fast against vibration — provide a seal against liquid leakage — just tap a hole and use Long-Lok, no inserts, safety wire or lock washers needed.

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length, employs 20 welding heads which will simultaneously accomplish 10 welds approximately 85 ft. in length.

With 3000 ft. of welding contained in each of the new flat cars, Pullman-Standard is laying down 36,000 ft., or approximately seven miles of welding a day, in mass-producing the cars 12 a day.

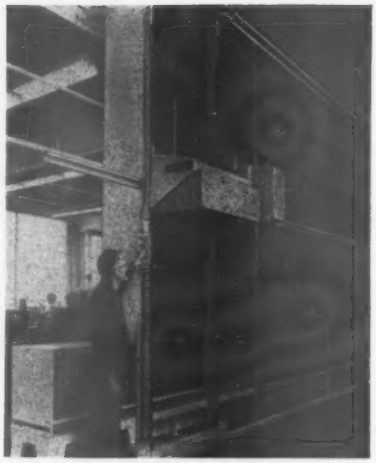
BIGGEST FOR NEWEST: GE's 450,000 KW GENERATOR

A glistening high pressure turbine rotor will go into the nation's first steam turbine-driven generator with water-cooled stator windings.

The 450,000 kilowatt turbine-generator unit being built by General Electric's Large Steam Turbine-Generator Department will be one of the largest capacity machines in the history of the electric power industry when it is installed in the new addition at the Philip Sporn plant of the American Electric Power System at Graham Station, W. Va.

A similar 3600/3600-rpm, cross-compound, six-flow turbine-generator unit with oil-cooled stators is being installed in the Breed plant of the Indiana & Michigan Electric Company, also of the AEP System.

Each of these units will be theoretically capable of supplying the residential electric requirements of a city with a population half the size of New York City.



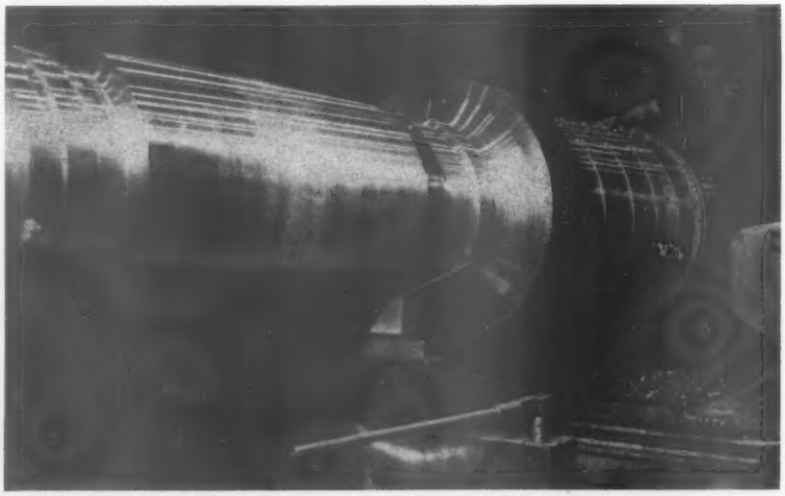
NEW FLOOR-TO-CEILING storage wall that "comes to life at the touch of a button" has electric controls which enable the carrier unit of the Triax Retriever to bring loads up to 4000 lbs. to or from any compartment.

CHRYSLER DISPATCHES CARS BY TWO-WAY RADIO SYSTEM

The largest two-way radio system in the automobile industry is being operated by Chrysler Corporation, to dispatch cars and trucks between 40 plants and office buildings and 3500 supplier firms in the Detroit area.

The radio operates in the 460-470 megacycle range and features a unique no-interference device designed by General Electric. The radios operate only when a coded signal is received from another Chrysler unit.

Installed in 85 vehicles, the system has led to more efficient transportation.



Machining GE's turbine rotor produces some parts with tolerances closer than the parts of a fine watch. It will be the largest of its kind when installed.

WIND TUNNEL BUFFETS MISSILES AT 15,000 MPH

Private industry's fastest and hottest wind tunnel is subjecting missiles to the fantastic speeds and temperatures encountered while re-entering the earth's atmosphere.

The Lockheed "Hotshot" in Van Nuys, Calif., has reached velocities of 15,000 mph and 12,000° F.

The 44-foot long tunnel is powered by a system capable of 20 million kilowatts. Firing, limited to 1/25th of a second because of the heat, is triggered by a giant electric arc which drives gases under pressure through a diaphragm, then a pinpoint hole and down the tube against the nose cone of a model missile, such as the Navy's Polaris.

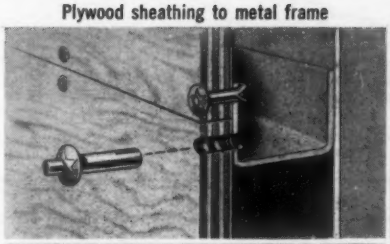
Technicians connect the cables from a 320-capacitor power supply to a giant co-axial cable which furnishes the spark to the wind tunnel's arc chamber.

Despite the explosive release of energy, the sound outside the tunnel is no louder than the crack of a .22 rifle.

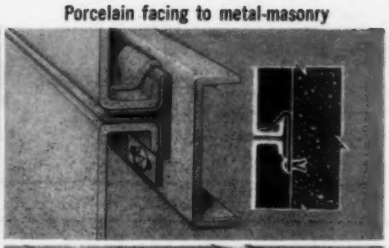
TRANSLATE 60,000 PAGES SOVIET JOURNALS ANNUALLY

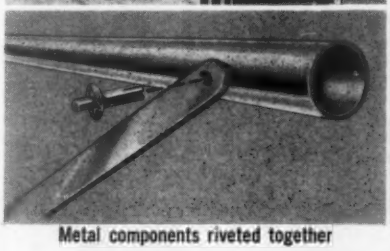
English translations of Soviet scientific and technical journals are available now at the rate of about 60,000 pages a year, says the National Science Foundation. Write the Foundation about information on 53 English editions of Russian journals, four extensive series of scientific abstract translations, and four series of partially translated journals. Work is being done by NSA, National Institute of Health, Office of Naval Research, AEC and six commercial firms.

Plywood sheathing to metal frame

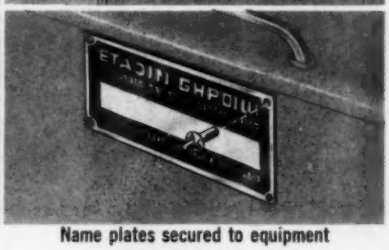


Porcelain facing to metal-masonry





Metal components riveted together

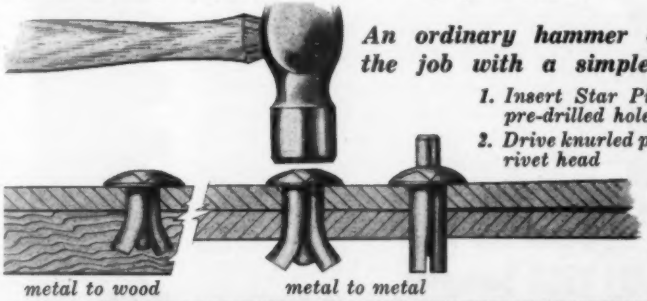


Name plates secured to equipment

for high speed riveting with an ordinary hammer

STAR PIN-GRIP

Star Pin-Grip hammer-drive blind rivet eliminates the need for explosives, special tools or special skills. Pin-Grip does the job of a conventional rivet—faster, easier, safer, with real economies in time and labor. Aluminum alloy body of Pin-Grip is assembled with a stainless steel, knurled drive pin (or on special order with aluminum drive pin). Wide range of Pin-Grip sizes available with these head styles: Universal, 100° Countersunk, Full Brazier, Panel, Splash Flat and Splash Round.



An ordinary hammer does the job with a simple one-two!

1. *Insert Star Pin-Grip into pre-drilled hole*
2. *Drive knurled pin flush with rivet head*

metal to wood *metal to metal*

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Vol. 2, Issue No. 1 | Bartlett, Illinois (Chicago Suburb) | Progress Edition

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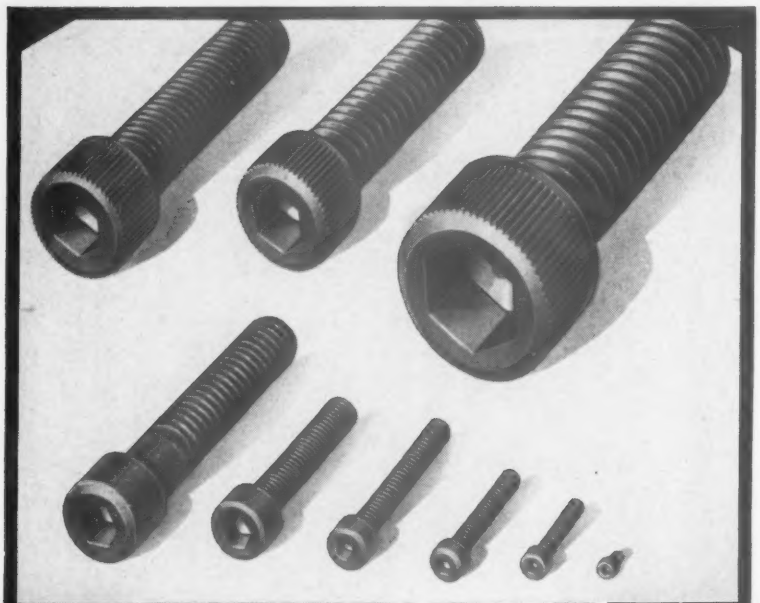
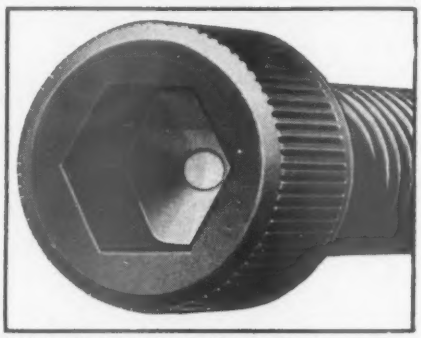


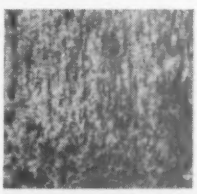


"PERFECT-HOLE" SOCKET shows smooth, chip-free interior. Mating surfaces are perfectly formed for maximum grip on hex key. Takes higher tightening torques.

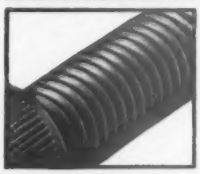
A complete line of Cold Forged Socket Head Cap Screws produced on specially designed machinery assures perfect, chip-free sockets every time. Hex keys insert completely into the "Perfect-Hole" socket *perfectly*. You get maximum gripping area for equally distributed tightening torque.

Threads are rolled to unmatched precision for snug-hug of mating thread... Available with or without knurled heads in high grade Alloy Steel. Choose from size 8 to ⅝... Isothermal heat treated for extra strength.

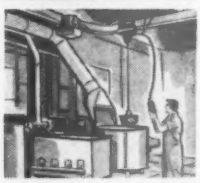
GRAIN STRUCTURE of steel when cold forged follows a smooth pattern... Compressed Metal has added strength through entire body of screw.



ROLLED THREADS assure perfect fit every time... Continued holding strength for extended usage.



HEAT TREATING by our special Isothermal Heat Treating process adds more strength... stops scale, improves finish, prevents decarburization.



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Get your samples of these top quality Cold Forged Socket Head Cap Screws... Actually compare these Setko "Perfect Hole" Cap Screws with any others for yourself. Send the coupon attached to your letterhead today... Outline your requirements, sizes, etc., and we'll send your "Test" Samples... Indicate the quantities you're interested in and we'll quote you our advantageous prices.

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Assembly and Fastening Ideas

HUGHES AUTOMATES COMPUTOR WIRING

For the first time, Hughes Aircraft will automatically wire sections of electronic computors in its airborne communications system at Wright Air Development Center.

A $40,000 4x4x5 machine designed by Gardner-Denver Co. will simplify assembly, eliminate error and reduce inspection time.

The machine, programmed from a coded wiring list that specifies the operating sequence of the two wrapping heads, can be operated by keyboard or punched tape. It attaches the wires to terminals by solderless wrapped connections and can place 10,000 wires on a 20x20″ board having a modular terminal spacing of .20″.

Two connections can be put on each terminal where diffusion forces cause intimate contact to remain even under high temperatures. The machine lays the wires in straight-lined or L-shaped patterns.

BRAZING CUTS ENGINE PARTS COST 45%

A high temperature brazing process, which makes possible the use of stampings in place of investment casting, is helping to save as much as 45% on finished-parts cost for the Vac-Hyd Processing Corp. in producing close tolerance radial diffusers and nozzle rings for aircraft engines and turbochargers.

The parts are first stamped from heat-resistant stainless sheet with hole-located vanes and assembled. Two types of brazing methods are available—vacuum brazing for critical stress applications or hydrogen brazing, adequate for most production needs.

Vacuum brazing reports 50% increase in the tensile and fatigue strength of joints. Pressures as low as one micron are used for certain materials.

For hydrogen brazing, a material similar to nickel-base Inconel alloy is spotted to each joint, capillary

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SILVER BRAZING PREFORMS

In addition to round and flat wire rings, blanked and edgewound washers, Lucas-Milhaupt provides a complete line of preforms which include such shapes as elliptical, rings, hinged rings, segments, slugs, U clips, hairpins, etc.

Send your drawings or sample part and the proper preform will be designed to do your brazing job faster at less cost.

Preforms in any size or shape that . . .

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- Speed Assembly Work.
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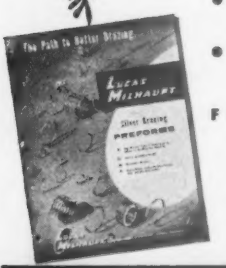
- Meter Silver Solder to Flow In and Around Joints.



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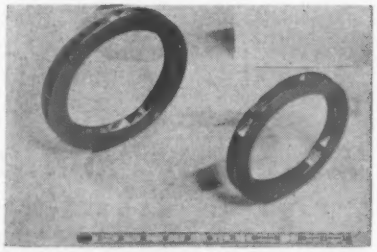
action induced by heat during the joining cycle assuring proper distribution. From 60-75 parts are then racked in a sand-sealed retort which is purged and operated, in the furnace, at a low dew-point temperature just over 2100°F. The parts remain in pure-dry hydrogen atmosphere for about four hours.

After inspection, the parts are finish machined by grinding.

The absence of fluxes offers clean assemblies.



Stainless steel nozzle rings for aircraft engines and turbochargers are now hydrogen brazed, instead of investment cast, in atmosphere over 2100° F by Vac-Hyd Processing Corp., Highland Park, Michigan at cost savings up to 45%.

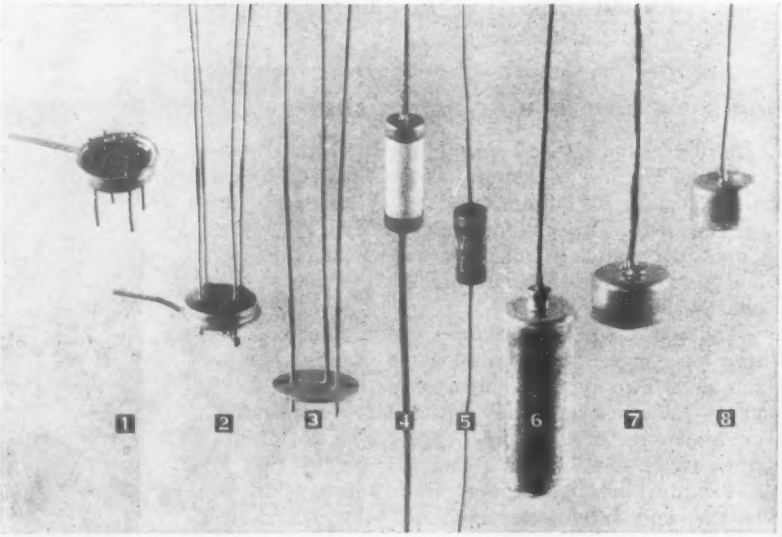
HEAT PROGRAM TIMER AIDS WELDING OF SMALL ASSEMBLIES

Problems associated with the resistance welding of small assemblies are being solved by a new heat program timer, developed by Raytheon Manufacturing Co. This is the first device available for use with low power bench equipment under 5 kva capacity.

Raytheon itself is using the equipment in its Missiles System Division to weld, for example, kovar to molybdenum for magnetron tube heater leads; also in the tweezer welding of nickel tubing to nickel wire.

The timer provides a controlled gradual increase in current just before the weld period and a gradual decline in the current after the weld period. The conditioning phase is adjustable over a range of 2 to 10 cycles, the welding phase over 10 cycles, the "annealing" phase over 2-10 cycles.

The timer is especially valuable in the spot welding of copper to copper.



Small metal parts joined by the new timer control are identified from left to right as follows: 1 and 2, tinned copper to nickel-iron cup; 3. Tinned copper to aluminum shell (for capacitor); 4. Diode assembly; 5. Tinned copper to nickel-iron cups on resistor assembly; 6. Center wire is tinned copper welded to kovar disc (for semiconductor package); 7 and 8. Nickel tabs to tinned dumet wire (for semiconductor package).

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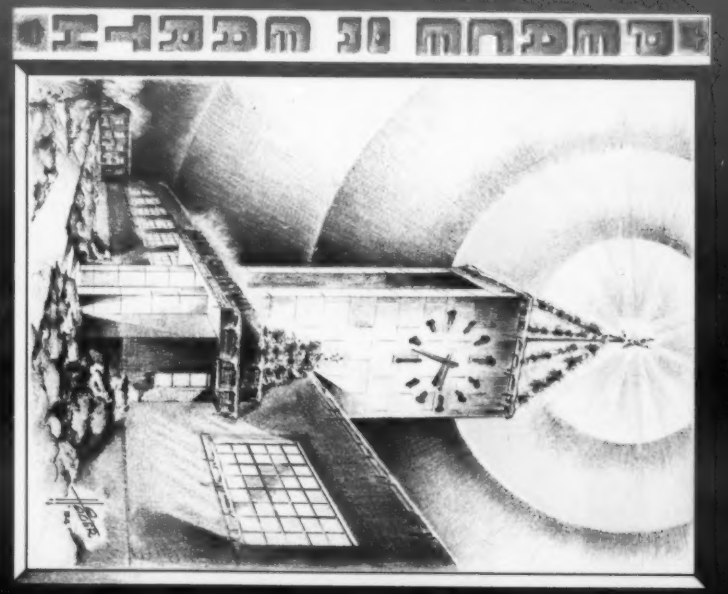

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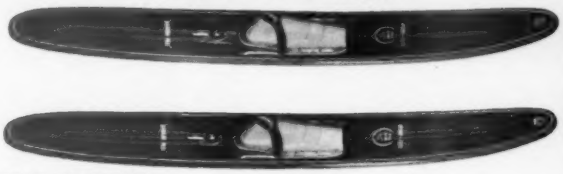

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A DIVISION OF GENERAL ELECTRIC COMPANY

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WASHER MODEL LW990
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1959 HOTPOINT SIX-CYCLE AUTOMATIC WASHER
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MATCHING VENT-FREE, DRY 'N WEAR DRYER

Washer push buttons automatically select correct wash and spin speeds, wash and rinse temperatures for all fabrics.

Dryer pumps heat, lint and moisture down the drain; requires no venting; choice of three automatic cycles for all types of fabrics.

Season's Greetings

To our Customers and Associates may we acknowledge with humility and gratitude your wonderful patronage and cooperation during this past year.

May our Faith in the Future be manifested in a common effort toward Peace on Earth and Goodwill to All Men.

Merry Christmas and Happy New Year

Rockford Screw Products Co.

Swan Hillman

PRESIDENT AND GENERAL MANAGER

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REUSABLE HOSE COUPLING WHIPS VIBRATION PROBLEM

Missile and jet aircraft are now using a new hose fitting on flexible fuel and hydraulic. The end couplings, which are reusable and have a special self-energizing metal-to-metal seal, make the cable line safer and more secure.

Resistoflex Corp. developed the triple-lock fitting which gives a positive grip on the braid of Allegheny Ludlum stainless steel which sheathes the hose tube.

Under test conditions the threaded lock ring did not distort even when over tightened. Vibration, the plague of former reusable coupling designs, has no effect.

PERCUSSIVE STUD WELDER FOR LIGHT GAUGE METALS

A new system for end welding studs to light gauge metals operates on a stored energy principal which discharges its current and end welds a fastener in .006ths of a second.

The KSM Products equipment will weld six to eight small studs and fasteners per minute to various combinations of ferrous and non-ferrous thin metals (down

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MODEL 7C HARNESS CLAMP

speeds up installation and maintenance

- Opens or closes with a quarter turn
- Clamp captive to structure
- Easily mounted with rivet or bolt
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- Sizes range from ¼" to 1¼"

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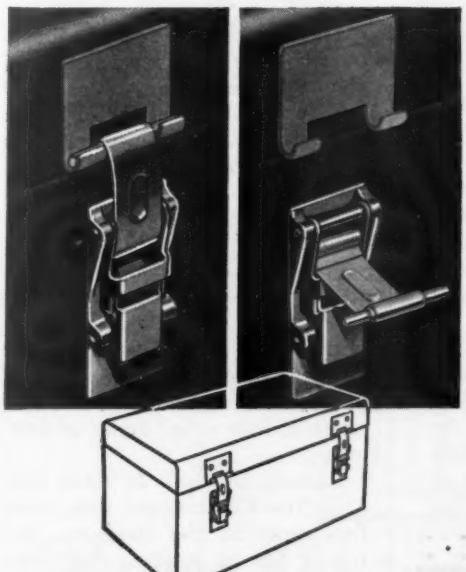

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MODEL 30L

MINIATURIZED

TOGGLE TENSION LATCH

- Ideal for equipment boxes stored in limited space
- Compact, light weight with shallow envelope
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- Ultimate strength 150 lbs.
- Provision for safety wire
- Simplified mounting with aluminum spot weld

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Loctite-coated screws store for days... lock when assembled

Loctite is the liquid lock that makes any threaded part self-locking. Loctite converts automatically to a tough, heat and oil-resistant plastic seal when confined between engaged threads. Locking action develops over the entire contact area, providing unequalled resistance to vibration. No heat... no mixing... not sticky.

Whether you use 20 or 20,000, you can get savings of up to 70% using Loctite and ordinary fasteners to replace more costly mechanical lock fasteners. For product reliability at lowered production cost, send for complete information on Loctite.

LOCTITE® SEALANT
AMERICAN SEALANTS COMPANY
135 Woodbine St., Hartford 6, Conn.
In Canada: J. S. Parkes & Co., Ltd., Montreal

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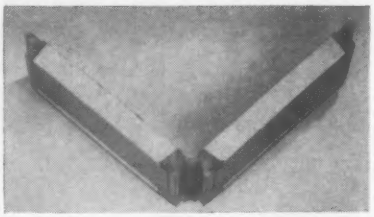
28 gauge). Weld diameters are up to 3/16".

A small 2½ lb. portable hand tool holds the stud and closes the circuit allowing the welding current to be discharged when placed against the work. A vernier voltage control is used for power setting, operating from either 115V/230V, single phase, 60 cycle AC. The average pin or stud welding rate is six to eight per minute.

PLASTIC FOAM FASTENS, BONDS AND INSULATES NEW LID



Filling and clamping of the lids are done on a jig that rolls under the Nopcometer, which measures the exact amount of foaming mixture into the neoprene frame.

Urethane foam is being used in place of nuts, bolts and screws in the making of "flip-flop" lids for ice cream and soft drink storage cabinets. The foam bonds all parts so securely that no other fasteners are needed.

The Keaton Rubber Co., Kearny, N.J. finds that the strength of the foam eliminates the need for a separately assembled hinge and permits a design in which a thin section of the synthetic rubber frame serves as a hinge.

Opened and slammed 205,000 times on a testing device, the new lid equaled 20 years of duty and showed no wear.

The plastic filling the lid is Lock-foam, a foamed-in-place polyurethane manufactured by the Nopco Chemical Co. of North Arlington, Va. It completely fills all spaces, bonds tightly and insulates.

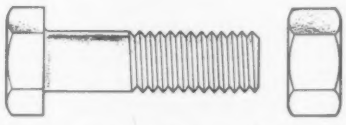
Achieved by mixing urethane resin with isocyanate, the mixture can be poured into any void and the resulting foaming action will force the plastic into every open space. While the foaming occurs, the material is highly adhesive and will bond tightly to any surface it touches. As the finished foam constitutes a ten-times expansion of the volume liquids needed to make it, the ingredients for producing a large number of tops can be stored in a small area.

With the Nopcometer, Keaton has been able to establish a production line.

RB&W DESIGNS STRONG, CLOSE TOLERANCE HEX UNIT

"A major step in fastener simplification," is the claim of one manufacturer after consolidating in one hex bolt and hex nut features of four other types of fasteners.

Russell, Burdsall & Ward Bolt and Nut Co. reports that since flow lines in the steel are distorted less in heading hex bolts (than in square headed bolts), strength is greater, tolerances closer. Double chamfering and countersinking permit correct assembly from either side. The units allow faster, easier wrenching and the standardization reduces the need for stocking square wrench sizes. Either a 6 or 12 point socket wrench can be used.



The unit is said to replace the square machine bolt with rolled

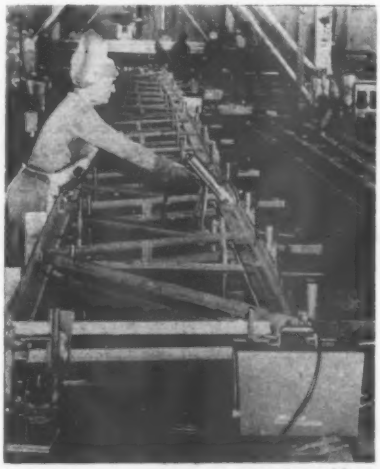
thread, square nut; square head machine bolt with cut thread, square nut; hex head machine bolt, hex nut; bright cap screw with National Coarse Thread in the solid die range.

The designers claim that the new unit is lighter, more attractive due to a smoother surface finish and made to ASA dimensions.

END-WELDED STUDS SAVE IN STEEL JOIST FASTENING

Fabricators of long span steel joists are saving up to 40% of the former cost of providing a fastener for lateral bridging members by using a newly developed end-welded stud instead of hand welded clips.

Nelson studs of this type were applied three to four times faster than bridging clips during recent fabrication of "L" Series steel joists by a major steel joist fabricator at one of its southern plants. Punched holes in the heads of the studs accommodated bolts for attaching cross bridging.



Positioning accessory insures accurate welding of studs in the V of the chord members of "L" series steel joists.

A Nelson NS-10 stud welding gun with a special positioning accessory welded the studs accurately at a 45° angle in the "V" of the joists' top and bottom chord members. This precise welding assured proper alignment of the cross bracing.

Other advantages of end-welded studs included elimination of shearing, punching and moving the clips to the work area; easy nesting of joists for shipment, and neater appearance of the finished job. •

TIME TO LOOK AT COSTS

You need the answers to such questions as:

"Can a TUBULAR RIVET replace a solid rivet, screw, or bolt and thereby accelerate production?"

"Would a SPLIT RIVET with a decorative head improve product appeal?"

"Should a SELF-PIERCING RIVET be used and eliminate a drilling operation?"

"Can a cold headed part such as a SHOULDER RIVET serve as a fastener and also provide a bearing surface?"

"Would a TAPPED RIVET, made to receive a screwed-on assembly, simplify field service?"

These are typical questions asked of Chicago Rivet engineers because keen competition today makes necessary re-examination of production methods. No matter how complex or how simple your fastening problem may seem to be, get the cost saving advice that Chicago Rivet engineers can give. Send blueprint or sample assembly—no obligation.

There are Chicago Rivet Machines that will set

Tubular or Split Rivets At a Time

Chicago Rivet & MACHINE CO.

946 S. 25th Ave. · Bellwood, Ill. (Chicago Suburb) · Branch Factory: Tyrone, Pa.

FOR YOUR FILES—Rivet catalog describing 1388 standard tubular and split rivets and 26 single and multiple automatic rivet setters.

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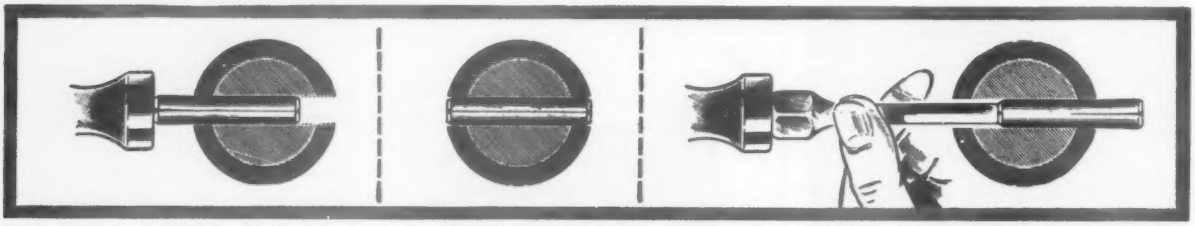
what makes this fastener DIFFERENT?

Several things. Rollpin® is a slotted, chamfered, cylindrical spring pin which drives easily into a hole drilled to normal production standards. It locks securely in place, yet can be drifted out and reused whenever necessary. This eliminates special machining, tapping, and the need for hole reaming or precision tolerances. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

And here's another difference that makes Rollpin the quality fastener in the field: ESNA's quality control builds consistent strength and performance into every Rollpin. Rollpin is uniform as to shear strength, dimensions, hardness, and insertion and removal forces.

HOW YOU INSERT IT



Drives easily by hammer, arbor press, or air cylinder and can be readily adapted to an automatic hopper feed. Requires only a standard hole, drilled to normal production-line tolerances.

Locks securely in place without using a secondary locking device; won't loosen despite impact loading, stress reversals, or severe vibration.

Removes readily with a drift pin without damage to pin or hole, can be used again and again in original hole.

HOW YOU SAVE

You pay less for Rollpins than for most tapered, notched, grooved or dowel pins. Installation costs are substantially less than for any fastener requiring a precision fit or secondary locking operations.

Because of their tubular shape, Rollpins are lighter than solid pins. Production maintenance is reduced with Rollpins: they do not loosen and because of their spring action they tend to conform to the drilled hole in which they're inserted, without material hole wear, eliminating the necessity of re-drilling or using oversize pins.

MATERIALS AND SIZES

Standard Rollpins are made from carbon steel and Type 420 corrosion resistant steel. They're also available in beryllium copper for applications requiring exceptional resistance to corrosive attack, good electrical, anti-magnetic, and non-sparking properties. Stock sizes range from .062" to .500" in carbon and stainless steels.

ROLLPIN®

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA

R40-1297 2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

- ☐ Rollpin Bulletin
- ☐ Elastic Stop nut Bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

Street_____

City_____ Zone____ State_____

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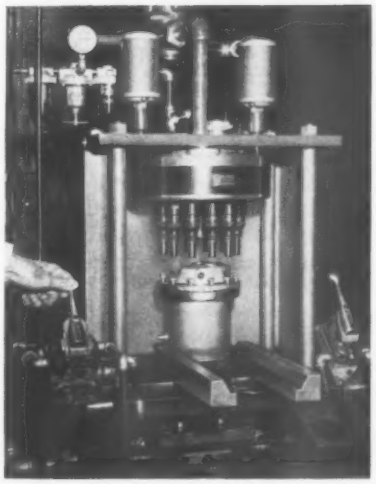


NUTRUNNER ASSEMBLES COMPRESSOR IN 10-SECOND CYCLES

A leading producer of refrigeration and air-conditioning equipment has turned to multiple nutrunning for quick, low-cost assembling of compressors. Using a Buckeye 12-tool unit, 12 cap screws are dropped into position in the two major components of the compressor.

The unit is moved in on the ways, properly positioned by two spring-loaded locating pins. An operator depresses the twin safety throttles and, from this point on, the operation is automatic. The complete cycle requires less than 10 seconds.

An air cylinder underneath the compressor housing raises the unit, forcing the upper part against a smaller air cylinder moving down from the top. This positive clamping action assures uniform tie-down of the two components, helping create perfect metal-to-metal compressor seal.

As the nutrunners begin their work, the upper cylinder retracts slowly from the greater pressure developed by the larger, lower cylinder. This action maintains the firm contact between the compressor components until all 12 cap screws are firmly seated under uniform pressure.

Upon reaching pre-determined torque, the tools stop, the operator releases the safety throttles and the assembled compressor moves back down to the ways where it is removed. A rotary air motor powers the operation.

CONVAIR CUTS COSTS WITH LARGE-SCALE METAL BONDING

An unusual hydraulic press is cutting costs in the manufacturing of aircraft structure at Convair (San Diego), a division of General Dynamics Corp.

The 1400 ton press is used for bonding together thick gauge metal parts which have been preblanked into the desired shape and size. In this way, heavy gauge structural members are produced accurately and inexpensively.

Lamination assemblies are loaded on an aluminum tool plate which is powered into the press over a series of rollers. The positioned plate is lowered onto a hot plate built into the press bed. A press slide, equipped with

continued

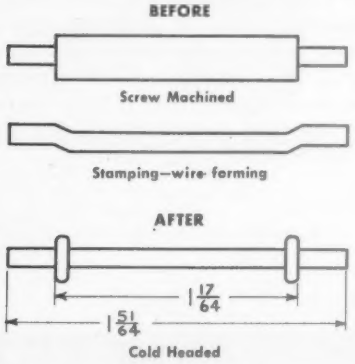
Design Analysis On Fasteners and Small Parts

Hassall Re-Design Often Means Big Savings on Parts

The most important consideration we can point out to the designer or purchaser of fasteners and small parts is that any part which can be machined from rod stock is also potentially available from the cold heading manufacturer. This technique offers speed of production, without scrap loss, plus superior strength and appearance for low cost and high design efficiency.

Perhaps our greatest contribution to your operation is our re-design service. An expert cold heading designer can very often study your drawings and come up with a modified part which will be lower in cost, stronger structurally, and easier for you to assemble.

This spacer is typical of such a Hassall re-design. Note the customer's drawing . . . this is a stamping, not too accurate, with poor bearing surfaces and not too easy to handle in assembly.



Now, look at this spacer as redesigned for cold heading. Now, a double collar spacer which is very accurate, structurally much stronger, and with much better bearing surfaces. And lower in cost!

Given complete specifications, including a drawing and an idea of the application, we can quickly tell you whether or not it will be advantageous to have your part or fastener JOB-DESIGNED by HASSALL.

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Manufacturers Since 1850

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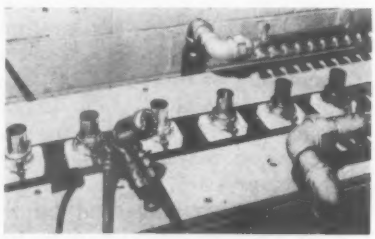
a similar hot plate which steam heats to a maximum of 400° F, moves down onto the assemblies and bonds them. After automatic retraction and removal, another plate, which has been set up on the opposite side of the press, moves into position for a new cycle in the highly-accurate press.

Finished bonded assemblies are subjected to a tear test.

Specifications by Clearing Machine Corp., division of U.S. Industries, called for an 18′x7′ slide and two 18′ tool plates, a bed area of 216″ x 84″, stroke of 28″.

AUTOMATIC SILVER BRAZING SPEEDS PRODUCTION LINE

By applying a process of high speed silver brazing to the production line, one manufacturer of fittings for internal combustion engines saves over $5000 a year.



Where formerly two operators were required to apply silver solder rings and flux, now an operator and Fuson Engineering automatic equipment do the same job. Material savings have averaged 10% and reject parts dropped to less than ½%.

The process automatically preplaces the brazing alloy and flux onto the parts while on the production line. Automatic heating devices then complete the brazing operation. The quality of the soldered joint is reported as held absolutely constant.

ELASTIC ADHESIVE SOLVES BOAT LEAKAGE PROBLEM

Wood clinker type boats tend to develop leaks in the planking joints after some use, discovered Penn Yan Boats, Inc., N.Y., when metal fasteners loosened, rubber sealers shrunk and caulking compounds provided ineffective bonding.

It remained for a new elastic, high adhesion, water resistant sealer made by Minnesota Mining to solve the problem. EC-1159 is applied by a pressure gun to the planking lap joints, vulcanizing to both sides of the seam. The viscous paste cures to a tough, rubbery state and, when seams widen, it stretches without cracking to remain watertight.

In one test, all plank-to-plank and plank-to-frame fastenings were removed from the pleasure boat and the boat run at top

continued

Pressure gun applies new water-resistant sealer to boat's planking lap joints.

Riveting With a Hammer in Blind or Open Applications

Elimination of special riveting tools can mean faster production, lower costs, no down time.

J. K. BARRY, M. E.

The use of blind rivets installed with only an ordinary hammer from one side of the job offers a highly simplified method of fastening. Speed, convenience and *low installed cost* make Drive Riveting preferable not only for blind joints, but for fastening many parts that can be reached from either side.

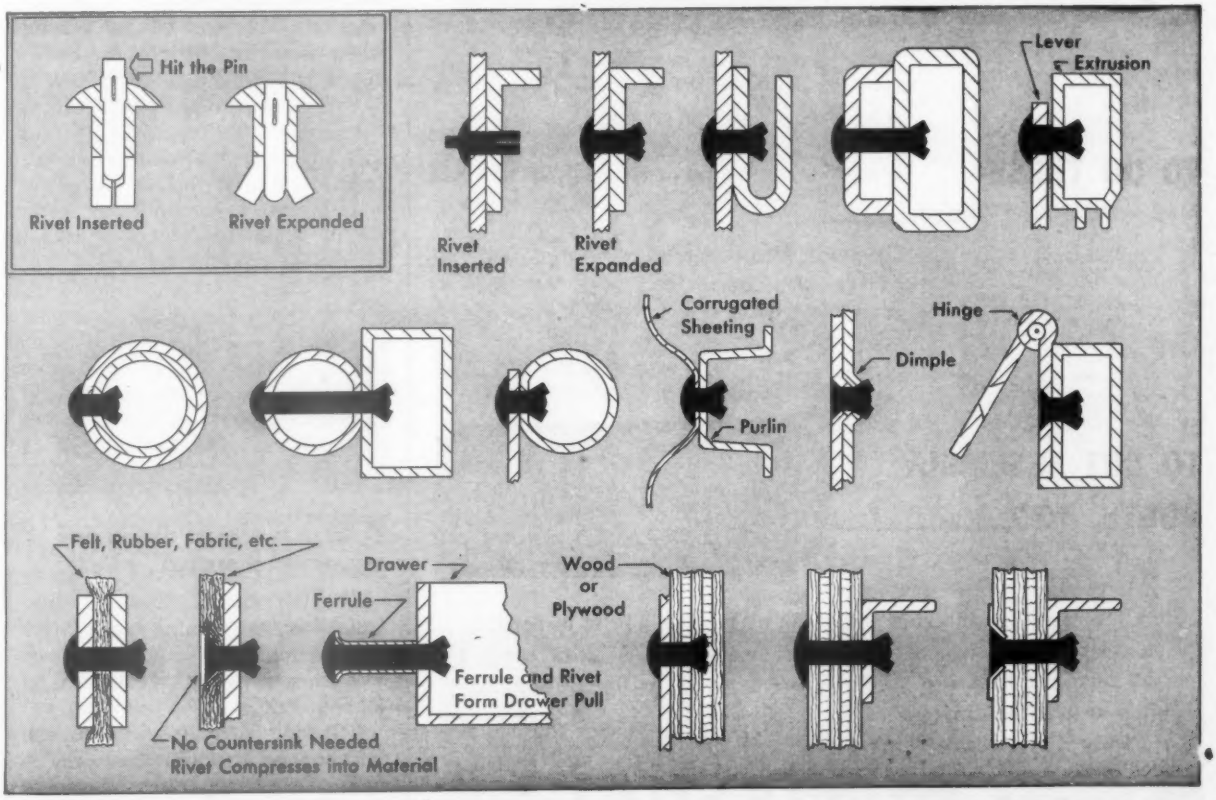
The Southco Drive Rivet has a cored, slotted body with a grooved pin protruding from its head. When the rivet is inserted through parts to be fastened, the pin is driven flush with the rivet head causing the expanding prongs to form a blind head behind the rear sheet. No further finishing is necessary, since the pin seats itself permanently to complete the smooth head contour.

Drive Riveting has five major advantages:

1. No investment in special tooling.
2. No lost time for tool repairs.
3. No limitation on the number of men who can install rivets.
4. Speed comparable to nailing.
5. Only one man is needed.

Widely used in truck bodies, storm doors, metal buildings and hundreds of other industrial applications, Southco Drive Rivets make a secure, vibration resistant joint. A wide range of head styles, diameters and grip lengths is available.

RECOMMENDED APPLICATIONS FOR DRIVE RIVETING



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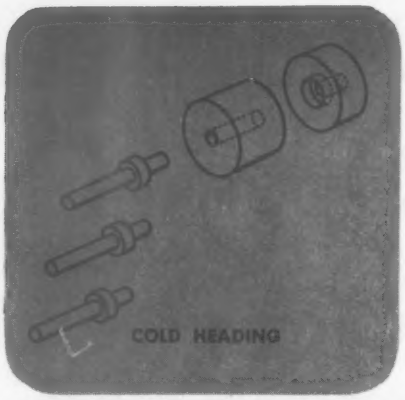
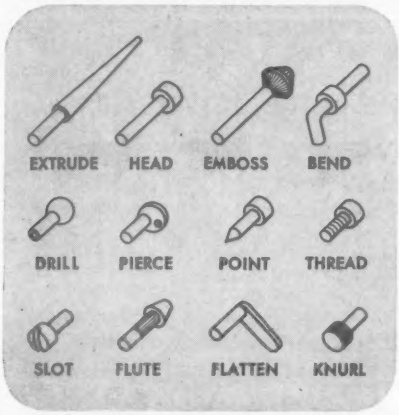
A SIMPLE VALUE ANALYSIS SESSION IN YOUR PLANT WILL SHOW YOU HOW COLD HEADING.....



CUTS FIRST COSTS OVER MACHINING.....

TO DO THESE
(AMONG OTHER THINGS).....



TO CUT ASSEMBLY COSTS, TOO.....

Purchasing and engineering people can profit from a brief demonstration staged by Progressive cold upset experts. Special fasteners and small parts you now use or contemplate using are analyzed for adaptability to cold heading.

Please write today, asking for a Cold Upset Analysis Session. Or outline your problem to us and we will promptly mail examples of first cost *and* assembly savings gained by parts produced by Progressive.

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speed with only the sealer holding it together. No leaks occurred.

CHRYSLER SOLVES DEBURRING PROBLEM

At Chrysler's Lynch Road plant in Detroit, the problem of deburring bolt holes on banjo housing faces where the differential housing is bolted on has been solved.

Operators now deburr holes while the housings are still on the conveyor, eliminating removal, re-hanging and fatigue. The job is done with a Cogsdill Burraway which replaced a conventional right-angle deburring tool.

One pass now chamfers both faces of the hole. On the in-stroke the spring-loaded cutter catches the outer face; on the out-stroke the cutter catches the back face. Spring pressure on the cutter is adjustable to change amount of the chamfer.

CURTIS-WRIGHT DEVELOPS SOLDERING METAL, FLUX

A filler metal, Curtisol, and Curtiflux, a fluxing agent, for low temperature titanium torch soldering have been developed by Curtis-Wright.

Curtisol, special solder for titanium and titanium base alloys, has a flow temperature between 1300 and 1400° F depending on the exact composition.

Joints with tensile strengths of greater than 40,000 psi can be made by anyone familiar with torch soldering techniques. At-

taining such strengths with butt joints is particularly outstanding for soldered titanium. The solder also can be used for short time vacuum furnace or inert atmosphere brazing without flux. Previous soldering materials required temperatures ranging between 1700 and 1800°F with the risk of possibly damaging the metal and giving joints with shear strength of only 20,000 to 25,000 psi.

Curtiflux is specifically compounded for low temperature silver solders. It melts at about 1000°F and can be heated to 1500°F without decomposing, sputtering, or balling up. Curtiflux remains translucent at the working temperature of the silver solder, allowing observation of the bonding process. The wetting action of the flux results in an improved "feathering out" of the solder on the titanium surface. The flux is easily removed with a water-acid dip.

AIR VIBRATOR FEEDER REGULATES LOCKNUT FLOW

A commercial heat treating firm, Benedict-Miller, Inc., of New Jersey, is finding an air vibratory feeder regulates an even flow of locknuts into a carbonitriding furnace.

Feed rate is approximately 200 lbs. per hour at 25 lbs. psi gauge pressure.

The Cleveland Vibrator feeders are constructed of high grade head resistant steel, which makes the hardening furnace application ideal since ambient temperature, at the discharge end, is 220 to 250° F. Air consumption is about 4.0 CFM of free air. •

secure your product quality
with HUBBELL premium miniatures

Here are the "tremendous trifles" upon which product quality depends. Hubbell miniature screws assure efficiency in your assembly operations, dependable product operation and long term product life and user satisfaction.

Hubbell miniatures are the finest obtainable. They are available in sizes #0 and #1 in steel, stainless steel or brass; and in head styles and sizes to meet your most exacting needs.

Hubbell quality can be your greatest production economy. If you have a special problem . . . call Machine Screw Department, Bridgeport, EDison 3-1181.

Even the PACKAGING PAYS OFF

New plastic "see through" boxes permit screw identification or inspection without opening the box.

Pressure-sensitive labels provide convenient identification by size and type; reseal the box securely after opening.

Sturdy "showcase" boxes stack easily, take up less room on storage shelves or work counters.

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OVER 60 YEARS' EXPERIENCE in the manufacture of highest quality, rolled thread machine screws and special cold headed parts.

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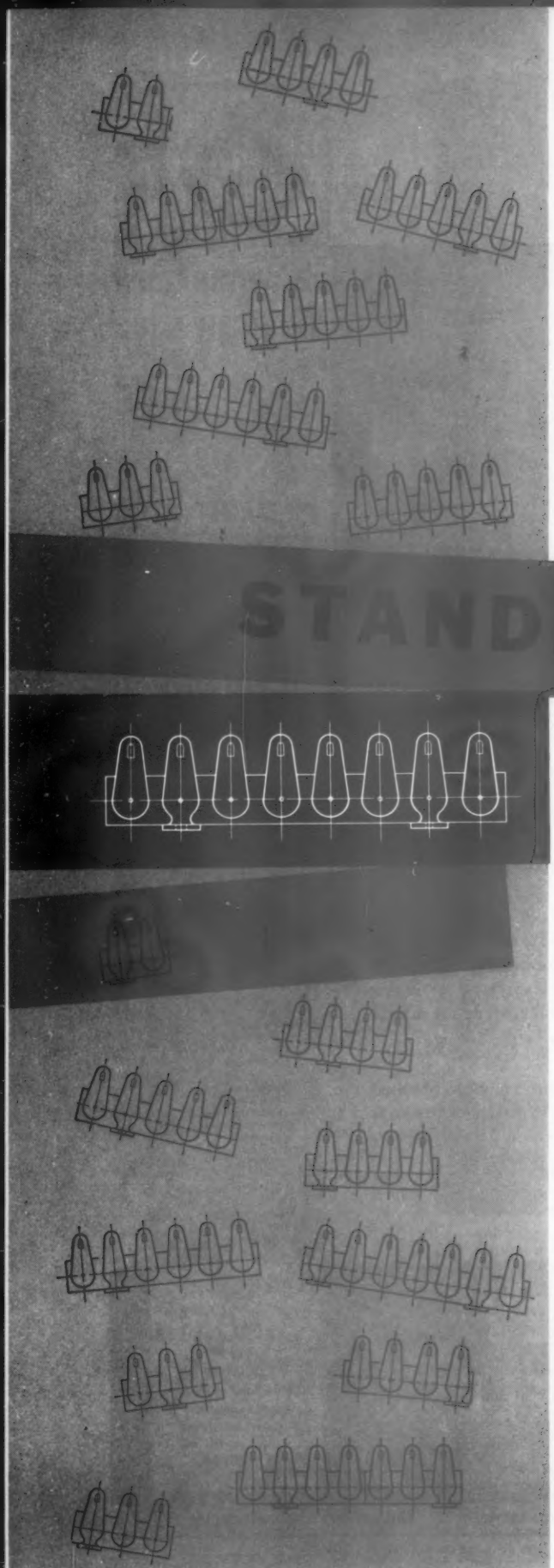


by **Darrell Ward**
Field Editor

STANDARDIZATION AIDS RESEARCH AND PRODUCTION

How two widely used fasteners, normally supplied in a myriad of styles and sizes, are reduced to but a few

Two examples of how standardization and simplification can cut research and assembly costs were cited recently by S. H. Watson, manager of the corporate standardinzing division, Radio Corporation of America, Camden, New Jersey. They are concerned with widely used fasteners normally supplied in a myraid of styles and sizes, but now reduced to a basic three or four kinds.

Mr. Watson's function is to coordinate, promote, and foster standardization throughout RCA. Close coordination between engineering, purchasing, manufacturing, material control and RCA suppliers is his specific objective.

At left is a display of 18 different tie-point terminals made from one stock board. Using fewer stock items to make a variety of parts is beneficial in both research and short-run production.

Each operating division of RCA has a standardizing section where one or more engineers devote at least part of their time to the standardization requirements of their division. All are concerned with uniform practices in engineering and quality and reliability built into their products. Operating divisions each give immediate and exhaustive consideration to specific applications of materials, electrical and mechanical components, and make autonomous decisions.

FROM MULTIPLICITY TO SIMPLICITY

The corporate standardizing group keeps abreast of these activities in order to glean all worthwhile material from each department or division and pass it along to the others. The standards experts also will analyze the essence of such material for comparison with existing standards. The results of a study may prove an idea to be unique on the one hand, or already covered in another situation. In either case, thus coordinating function in the standardizing division benefits all operating divisions. A specific benefit, among others, is that often the high cost of multiplicity can be pared down to the level of economical simplicity.

PAN HEAD SCREWS AND TERMINAL BOARDS

The two examples of this, as pointed out by Mr. Watson, are illustrated in a tie-point terminal board used for development work, and in pan head screws for general application. Both are relatively simple, standard fasteners which lead to complex problems in purchasing, stocking, and utilization because they are commonly found in so many varieties of sizes and shapes.

Project engineers frequently are faced with the need for parts in a breadboard layout of an experimental design. The exact parts needed may not be available in the stockroom. The usual solution is to use a similar part which will approximate the basic function, or combine parts whose consolidation will result in a similar function or characteristic.

Because of this approach to the problem, a breadboard layout, or even a preliminary prototype development, may end up with series-parallel networks of capacitors and resistors in the place of one or two, relays may have more contacts than required, and connectors and terminal boards may have many unused pins and solder lugs. Frequently these breadboard layouts and prototypes are a masterpiece of ingenuity in the utilization of standard stock items and the avoidance of special purchases.

With the aid of a pair of side-cutters, many of the more than 300 different types of tie-point terminals listed in RCA standards can be made from one basic board.

When a development is finalized, engineers can specify the exact parts needed in actual production. So, the spider web layouts are common practice and are considered perfectly satisfactory for experimental work. But, in a company as large as RCA, where innumerable projects are under development at all times, there is a serious problem for the purchasing department and another for the stockroom.

The standardizing division issued two bulletins explaining this problem and how it can be solved. One bulletin is devoted to the terminal board problem and another to greater utilization of pan head screws.

In RCA's standards books, there are over 300

continued

standard type terminal boards listed, But, with the help of a hack saw or a pair of sidecutters, over two-thirds of these standard numbers can be duplicated or simulated by removing a portion from one of a few preferred standard terminal boards. This situation and recommended solution is typical of bulletins which are prepared by the specialists in the standardizing division.

The terminal board problem is more or less limited to development work, although it can apply also to small run production. But, standardizing on pan head screws is not only broad enough to embrace even large production at RCA, it can apply to many other companies, some of whom have already adopted the practice.

THE PROBLEM OF INFINITE VARIETY

As with the terminal board, the problem with screws is multiplicity and infinite variety. There is no end to the number of sizes, shapes and styles of screws to be purchased, stock, and handled on an assembly line. In RCA's standardizing approach to the problem, specific attention was drawn to the utilitarian features of the pan head screw which is recommended as standard in every application where design, production, and service considerations will permit. It is pointed out that in the smaller screw sizes of ¼" and less, standardization of the pan head can eliminate or greatly reduce usage of at least five styles of screws: binding, fillister, truss, hexagon, and round heads.

The big feature of the pan head screw is its resistance to burring at the slot under screw-driver torque. This is graphically explained by the comparisons in the illustration (see line drawings of different styles of screws). In most cases, there is better engagement with the driving tool, less likelihood of fracture, better binding of the part, or all benefits combined.

SPEEDS ASSEMBLY LINE OPERATIONS

The choice of something as simple as a pan head screw for standard is almost a panacea to assembly line operations compared with the number of other possible screws with astronomical variables in materials, styles of heads, types of driver engagement, size of body, type of thread, length and finish.

The RCA standardizing bulletin mentions that these variables all have a reason for existing because, when properly selected and applied, they each serve an important need. However, in the great majority of cases, one will serve as well as another.

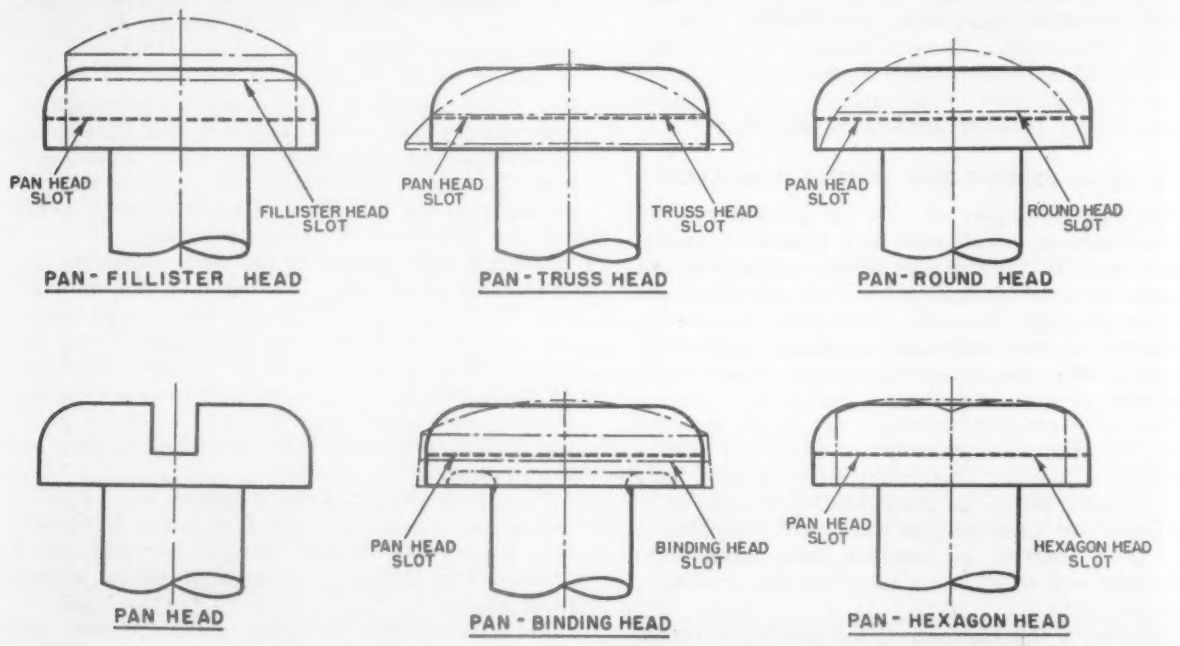
BETTER AVAILABILITY OF PARTS

Like many other companies, RCA has realized significant results in the form of greater volume of fewer items, better availablility of parts, reduced costs in purchasing, and greatly reduced inventory problems by taking the standardizing approach to such a simple thing as a pan head screw.

Current thinking in Mr. Watson's office may lead

continued

The choice of something as simple as a pan head screw, below left, for a standard is almost a panacea to assembly line operations. Standardizing on pan heads in sizes of .125 inch or under greatly reduces usage of other styles.



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HEX-SOCKET SCREWS
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These precision products have made ALLEN the number 1 name in the socket screw field!

Leader Point Cap Screw

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"Tru-Round" Pipe Plug

Allen Shoulder Screw

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"Tru-Ground" Dowel Pin

If hex-socket screws have any place in your life at all, our new plant at Bloomfield, Connecticut, has unlimited advantages for you.—If you're an engineer or designer, for example, the modern facilities of this new plant make available to you greatly increased engineering and metallurgical services in the development of dependable fastening for products you're designing—and higher standards of precision than ever before. If you're a manufacturer, this new plant is bound to be a rich source for new ideas in fastening, and new products that will make your own products better. If you are a distributor, this new plant means prompter shipments—and both new products for your customers and improvements in existing ones, all coming along rapidly now that we have the room we need and new equipment.

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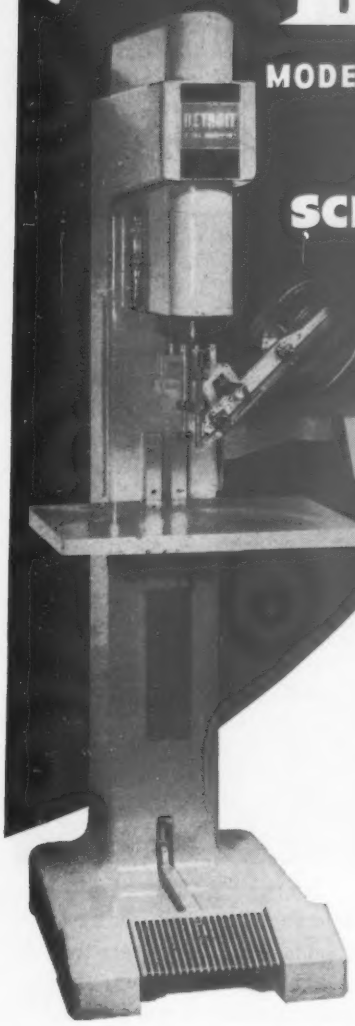
POWER SCREWDRIVER

WITH BRAND NEW FEATURES AND ADVANTAGES NEVER BEFORE AVAILABLE



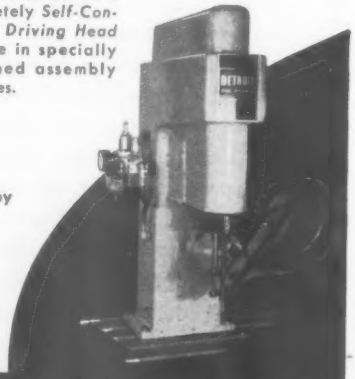
NEW TYPE POSITIVE CONTROL CLUTCH

- Not affected by changes in temperature or excessive oil or grease
- Sharply increased accuracy as to variation in torque tolerance
- Simplified design for easy servicing
- Requires no daily lubrication
- No friction devices of any kind used
- Long service life on all parts subject to wear

NEW TYPE HOPPER DRIVING MECHANISM

- No gears to wear out
- No lubrication required
- No costly replacement parts
- Simple design for easy servicing
- Built-in slip control as a safety feature

Also furnished as a completely *Self-Contained Driving Head* for use in specially designed assembly machines.



NEW TYPE FEED TRACK AND ESCAPEMENT MECHANISM

- Flexibility for easy and fast adjustment
- Escapement does not require daily lubrication
- Escapement design permits releasing screws by body or head as required
- Positive solenoid action
- Simple design for easy servicing
- Adjustable for full capacity of machine

Write for NEW BROCHURE!

DETROIT POWER SCREWDRIVER CO.

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to further simplification of this problem. This phase concerns screw length. The thought now being entertained is to stock a very few standard lengths of the pan head screw. Then, when an assembly requires, say, a 1⅜" length of a 1⅞" length, 2" screws can be cut to length. In small run production, and especially in prototype work, cutting to length may be more economical than special orders of the small quantities required.

ENGINEERS AS ERRAND BOYS

It certainly is cheaper to cut a screw to length for developmental work than to have high priced employees run out to the nearest hardware store to search for what they need. It is cheaper in many cases to cut a fair number of screws for small run production than to handle special orders through purchasing at a probable paperwork cost of $5 or more for ten cents worth of material.

Besides cutting to length as needed for small quantities, a further operation is being considered to overcome the problem of head size or shape. In rare cases a fillister head is required when a pan head will not fit into a counterbored hole or otherwise restricted space. The suggested solution for this will be to use a small hollow mill type of cutter to shave down the head diameter of the pan head to produce the required fillister head diameter, again using a basic style and size kept on hand in the reduced inventory.

NOT LIMITED TO "SPECIALS"

This standardizing approach, as Mr. Watson said, is not limited to the need for special sizes and shapes cut from standard. It is presumed that most applications will be for standard sizes normally listed in screw manufacturers' catalogs. The fundamental issue is to reduce variety found in standard sizes, increase inventory of fewer parts, and avoid

the cost of obtaining small quantities for each special occasion.

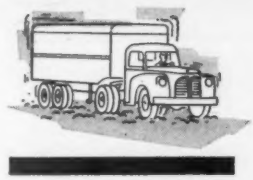
NEW BUSINESS OPPORTUNITY

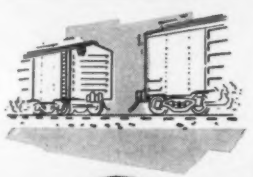
The operating division of the company may obtain their stock of special screws from screw manufacturers for large production, or from the local stock of cut-to-order standard screws for small production and prototype work. Although cutting standard screws to shorter lengths and even reducing head diameters are well established practices in laboratories and service shops, Mr. Watson cautions that expansion of the practice depends upon the introduction, by some specialty company, of an ingenious "screw cutter-offer" that will do the job in one quick, clean operation.

NOT LIMITED TO SCREWS

This kind of thinking is not limited to screws. Standardization can apply to many kinds of fasteners used every day, and often is applied by people who are aware of the high cost of handling a few parts in a wide variety. But, it cannot be reiterated too much that standardization is constructive not only for a company like RCA, it is constructive for the fastener manufacturer as well. Even those who specialize in custom made types of fasteners can offer the benefits of larger quantities at lower unit costs and fewer orders to handle when a user will standardize and simplify his basic needs. •

"That's pretty good. Now let's try it with a wrench."





With the new Townsend Versa-Lockbolt* you get the same high tensile values as with the standard type but they cost less and are easier to install.

Wider grip ranges in a given size are provided by additional locking grooves. Other design changes make it feasible to use them in relatively oversized holes. Inspection time is reduced since hole size is less critical.

These features make for flexibility of design—make calculations simpler and more accurate.

Versa-Lockbolt installation is fast and guns provide uniform draw down or clinch —locking the collar with up to five tons of pressure. The new collar with its flanged integral washer makes it especially suitable for fastening even light gage materials.

For more information on how to get new vibration-proof fastening economy, write Townsend Company, P.O. Box 237-U, New Brighton, Pa.

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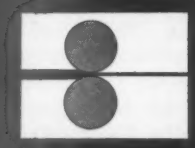

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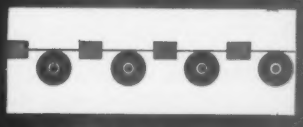
Continuous Tandem And Upright Cone Wire Drawing Machines • Bull Blocks • Wire Flattening Mills •



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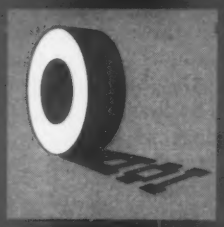

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Cam and Crank Eyelet Machines • Horizontal Redraw Presses • Multiple Plunger Pillar Presses • High Speed Blanking Presses • Collapsible Tube Equipment • Ammunition Machinery, etc.

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STITCHING SPEEDS TOY PRODUCTION

Sudden demand for spin hoops—hottest item since Davey Crockett hats—was met with stitching equipment at Perfex Plastics.

Colored metal stitches saved 50 percent in wire costs in the assembly of toy hat boxes at Pre-Pac.

Toy manufacturers use stitching to help meet sudden or seasonal market demands

Toy manufacturers face many of the problems inherent in any industry where seasonal changes are expected. New models must be designed and old standbys revised. Decisions have to be made. What materials and what machines to use? Can present equipment be modified? How can production be increased, bottlenecks eliminated, costs reduced or quality protected? And will new equipment fit smoothly into plant layout and material handling systems?

Metal stitching is one process which engineers in the toy industry have turned to in order to cope with sudden or seasonal changes in toy production. This fastening method meets the demand for high speed and economical assembly of many toys.

MAKE 8000 HOOPS A DAY

Perfex Plastics, Inc., of Chicago, turns out 8000 Spin-A-Hoops a day, using a Silverstitcher made by Acme Steel. These hoops are the hottest item since Davey Crockett hats.

In this process, the plastic tubing is extruded and automatically cut into proper lengths. A pre-cut dowl or plug is inserted in one end of the tube, leaving half of the dowl length exposed. The stitching machine operator first drives a stitch into the tube and dowl. She then forms the hoop by placing the other end of the tube over the exposed end of the dowl and stitching it into place.

26,000 STITCHES BEFORE RELOADING

This machine can drive up to 26,000 stitches before requiring reloading. Costs are held as low as one-sixth the cost of pre-formed staples by working from a continuous coil.

A different application finds Pre-Pac, Inc., of New York City, with a machine that drives

continued

colored stitches, saving 50 percent in wire costs in the assembly of toy hat boxes. Previously, the use of pre-formed staples required spray painting at a cost of 17c per thousand.

Now the operator sets up the side strip and backing of the box, places it on the machine, and drives three stitches by pressing a foot switch. The pieces are then taken to another area for further assembly.

Customer reaction has favored the new method, which leaves stitches clinched smooth with no chance of children scratching themselves while playing with the hat box.

A long-time user of metal stitching, Gong Bell Mfg. Co., of East Hampton, Connecticut, found their machine adaptable to a new design. In deciding to market a toy lawn mower with rubber tires, they found that wire stitching could be used to form strips of rubber into tires.

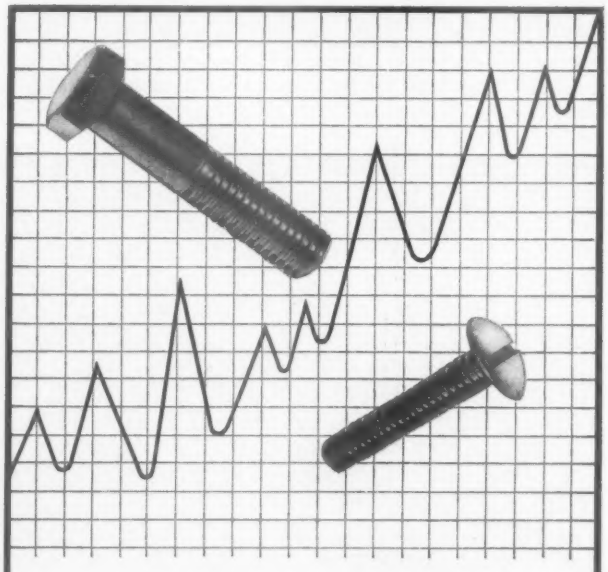
The operator takes the rubber strip, cut to length, and forms it into a circle inside out. The material is placed on the machine and secured with three stitches, placed between the threads and below the surface of the threads to produce a smooth joint without a noticeable gap. The tire is turned right side out for assembly.

Kiddie Brush & Toy Co., of Jonesville, Michigan, selected wire stitching for assembling a toy mop. Stitching secures the cloth mop strands to a polyetheline base. Five stitches in two rows assure proper holding even under hard play. Arcuate stitching wire is used. This wire is given an arc as it passes through the machine, adding strength and rigidity. •

Stitching secures cloth strands to polyetheline base of toy mop at the Kiddie Brush & Toy Co.

THE LARGEST STOCK IN STAINLESS STEEL FASTENERS COMES FROM ALLMETAL

You can get PROMPT DELIVERY of Allmetal Stainless Steel Products. Why not pick up your phone and call the nearest division. Direct teletype facilities for your urgent needs are available. You'll be happy you called. You will find this unique procedure the answer to your Stainless Steel fastener problems.



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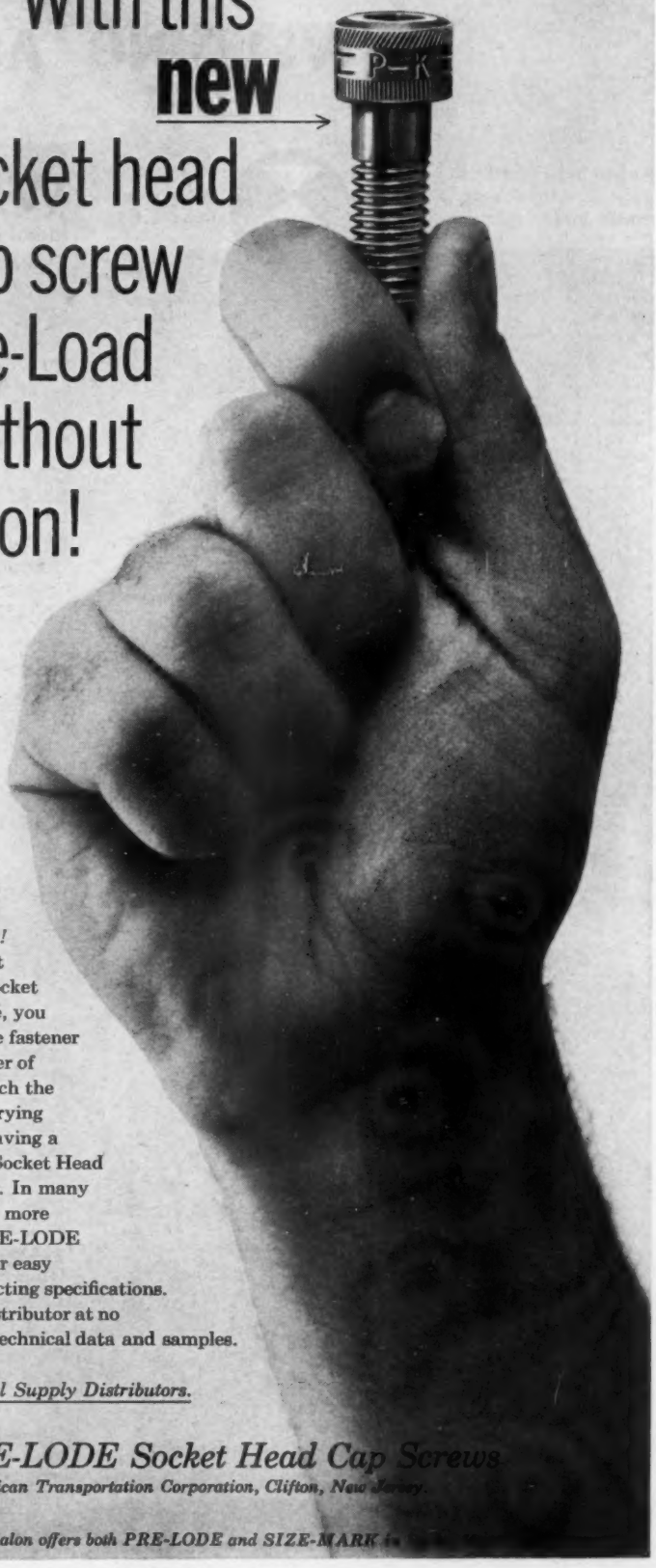

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Now . . . Parker-Kalon's new PRE-LODE Socket Head Cap Screw gives you *greater bearing surface under the head than ever before!* With this new head, a research achievement resulting from the combined efforts of the Socket Screw Manufacturers' Technical Committee, you can now apply higher torque . . . pre-load the fastener for maximum holding power without danger of marring or indenting softer materials in which the screw engages. This means greater load carrying capacity and better functioning in holes having a greater body clearance. P-K's PRE-LODE Socket Head Cap Screws are designed for high tightening. In many cases, the socket has been enlarged to allow more wrenching area. Standard sizes ¼" to 1" PRE-LODE Socket Head Cap Screws are *Size-Marked* for easy identification, and are manufactured to exacting specifications. Available now from your authorized P-K distributor at no increase in cost. Write today for complete technical data and samples.

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PARKER-KALON® *PRE-LODE Socket Head Cap Screws*

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WELDING ASSEMBLY TABS

by **Matt E. Heuertz**
Managing Editor

Arvin solves intriguing problem of producing fusion temperature inside deep drawn parts without appreciably heating vinyl-coated exterior

WHEN design engineers specified the new Arvinyl finish for a new portable transisitor radio, they asked manufacturing engineers at Arvin Industries, Inc., of Columbus, Indiana, to solve another intriguing problem in the fabrication of vinyl-metal laminates.

They had just developed a technique for deep drawing Arvinyl without rupturing or marring the plastic coating. And now the engineers were specifying a smooth exterior for the radio case. This meant that all assembly tabs—two spring clips, two handle stops, and the hinge bracket—had to be fastened by welding. This was the toughest fabrication problem encountered since Arvin undertook to pioneer in the expansion of the vinyl-metal laminate market two years ago.

William G. Morgan, chief welding engineer, explains that the problem was to produce fusion temperature on the inside of the deep drawn radio case without appreciably heating the vinyl-coated exterior. Since vinyl softens and blisters at about 250 F, this meant that welding heat had to be far more localized and brief than could be accomplished with conventional welding practices.

Furthermore, it was discovered that the weld must be delivered at the exact instant of plasticity of the metal. The precise periods of time involved had to be in a small fraction of the cycle. To give an idea of the exact control needed, consider that even though weld heat is applied for only 1/8 of a cycle, a small difference in the final temperature can turn the metal from a plastic to a liquid state. This would result in splashing, even vaporizing of the metal, and an unsatisfactory weld.

Working with engineers from Precision Welding & Flexopress, Bill Morgan and his staff developed a welding method utilizing a special magnetic-force type of welder which overcame the problems, and developed consistently strong welds.

Before the process was perfected, however, it was found that to make a good weld the assembly tabs (clips, stops and brackets) had to have a slight projection of specific configuration at the weld point. This projection was made at the same time that the tabs were stamped from coil stock.

An indirect welding technique is used because the electrodes cannot make contact on the vinyl side of the radio case. Both electrodes are placed on the same side of the case. Made from thin gage steel, the case itself completes the electrical circuit between the electrodes.

The projection on the assembly tab, located directly under one electrode concentrates the heat at the point of the weld. (Arvin has found that

continued

TO VINYL-METAL LAMINATES

Motorola radio cases, as fabricated by Arvin Industries from vinyl-metal laminates, have a tailored appearance difficult to achieve with other materials. Note the clean edges and rounded corners with no distortion from drawing or welding. The snap fastener, chassis locator flange, and hinging were spot-welded to the vinyl-metal case.

SOLDERLESS ELECTRICAL TERMINALS

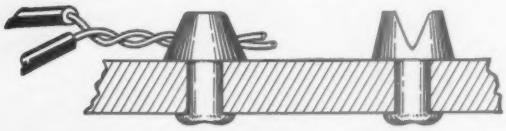
RIVET TYPE

When the jaws of this solid copper vee-slot terminal are squeezed, pressed, swedged, or hammered together, the wire is permanently clamped in a vise-tight grip that affords maximum contact for full current flow. Standard sizes are available in either screw or rivet types.

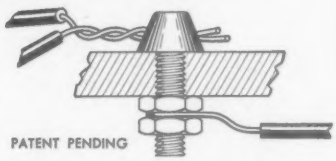
SCREW TYPE

SQUEEZES CLOSED HOLDS WIRE TIGHT

Closure is accomplished rapidly and accurately on the production line by the use of simple power press tools. Engineering drawings for the tool design will be furnished by Elco on request. For hand work, a die and anvil can be attached to the faces of parallel pliers. For single applications, the jaws of the terminal can just be hammered together, or peened over.



APPLICATIONS OF RIVET AND SCREW TYPES



Since this is a new product with many advantages and features, the extent of possible applications and the range of benefits and savings have yet to be fully explored. We invite you to . . .

WRITE FOR INFORMATION

. . . so that we may have an opportunity to work up applications for you. Our Engineering Department is at your service, ready to help in any way they can.

ELCO SCREWS

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multiple welds can be made simultaneously in series or parallel.)

The welding technique is as follows: First the radio case and the tab to be attached are clamped together under slight air pressure. Electrodes are brought in light contact. By initiating a synchronous electronic timer, weld heat is applied for approximately 1/8 cycle, at the end of which period a follow-up stroke completes the weld. Separate transformers actuate the weld current and follow-up pressure. Timing is so brief that follow-up is actually initiated before the weld current. The slight inertia of the press ram makes this necessary. But it is of no concern to the machine operator since the electronic timer, once set, completely performs its function.

The timer provides precise control of both the amount and timing of heat, and the amount and timing of force, either simultaneously or separately. This allows for fine adjustments to compensate for thickness and conductivity of metal, thickness of the vinyl coating, and other factors which may vary from one production run to another.

A number of assemblies made by projection welding have been submitted to destructive testing under the direction of laboratory personnel. In one test, an .038 in. epoxy-coated aluminum tab was welded to a sheet of .035 in. vinyl-metal laminate. Diameter of the weld was .180 in. The assembly had a tensile shear strength of 920 lbs. when subjected to a 50 degree angle of twist.

In another test, an .078 in. attachment material was welded to .062 in. vinyl-metal laminate. The weld diameter was .180 in. At an 80 degree angle of twist, the assembly had a tensile shear strength of 1350 lbs. •

Development of this magnetic-force type of welder permitted Arvin Industries to successfully spot-weld assembly tabs to cases deep drawn from vinyl-metal laminates.

IT'S NEW

IT'S A PUSH-IN NUT

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finger

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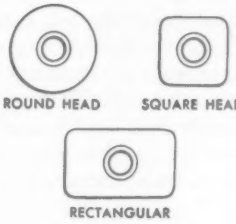

TABLE OF DIMENSIONS

For use with #8 or #10 screws, finished hole size .290/.281, application thickness .030/.060. Other sizes available soon.

HEAD SIZE	HEAD HEIGHT
7/16" DIA.	.150
1/2" DIA.	.030
1/2" DIA.	.040
1/2" DIA.	.070
1/2" DIA.	.150
1/2" DIA.	.100
3/8" SQ.	.040
3/8" SQ.	.140
13/32" SQ.	.030
13/32" SQ.	.200
3/8" x 37/64"	.060

This new Dot Nylon Push-in Nut offers additional design and performance advantages over our currently available plastic snap-in nuts. These advantages are:

(1) Straight legs permit easy insertion in square, punched holes and do not distort the holes even in soft aluminum or thin-gauge steel. (2) Burrs do not impede the nut or prevent proper seating. (3) Tapered screw hole causes legs to spread when screw is inserted and results in greatly increased pull-out resistance (see drawing A).

Ordinary sheet metal screws cut clean, strong threads in the molded nylon and the nut is both re-usable and highly resistant to vibration.

Used as a nut or as a spacer, Dot's Nylon Push-in Nut has wide application in all products where sheet metals or plastics are employed. They can be supplied with a moisture resistant sealer and special nuts can be designed to your specifications if volume warrants. Currently available in eleven sizes. Full information on request.

CARR FASTENER COMPANY

Division of United-Carr Fastener Corp., Cambridge 42, Mass.

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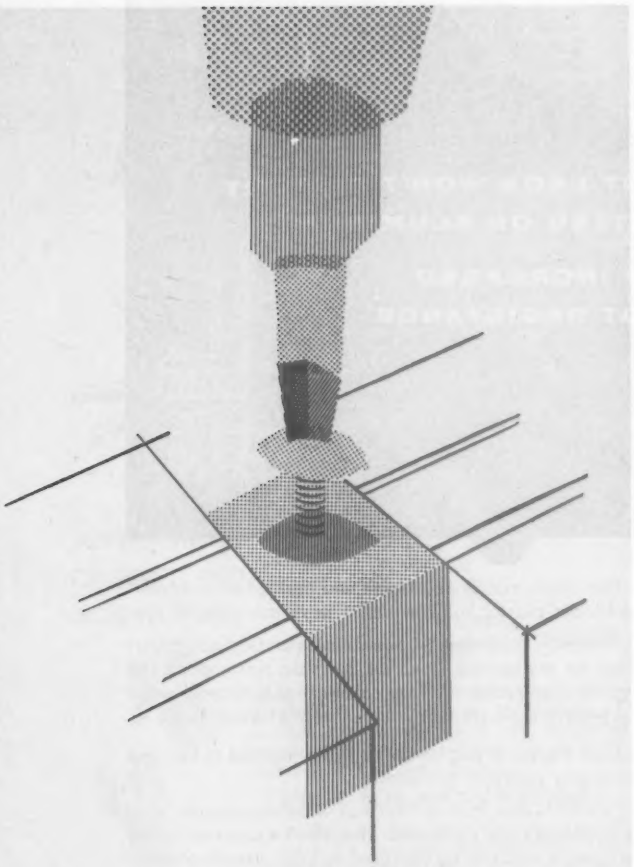
by **W. M. Hanneman**
Executive Engineer
Shakeproof Division
Illinois Tool Works

HOW TIGHT IS TIGHT?



WHAT assembly torque should be specified for a machine screw in a given application? Was the cause of a broken screw in an assembly the result of a wrong torque setting on the driver, the wrong screw having been specified, or was it just a low quality screw? What is the proper hole size and which type of tapping screw is best for specific application?

These questions, and others related to them often plague design and production engineers in industry today. It is unfortunate that many working engineers do not have torque and tensile data for small screws. These data and suitable means for verifying the screw properties often can be very helpful when trouble arises.

TORSIONAL AND TENSILE STRENGTH

When torsional and tensile strengths of screw fasteners are known, it is often possible that smaller screws can be specified with sufficient strengths for the application. Also, if space or weight limitations are a factor in design, heat treated screws of smaller size may be substituted for larger diameter soft screws—perhaps resulting in a manufacturing cost reduction.

While tension is the important function of a fastener in use, the applied torque to attain this tension is also of great importance, particularly to the man on the assembly line. Assembly instructions and practices often include definite torque limits for specific applications. To obtain the proper torque limits to avoid under-tightened screws or screws over-tightened to failure, requires some type of torque-measuring equipment.

A QUALITY CONTROL FUNCTION

Low carbon steel screws vary considerably in torsional strength which depends primarily on the hardness of wire from which they are made. The ability to measure the torsional strength of screws

Guide to find what assembly torque should be specified for a given application

can be considered a quality control function. Minimum torsional strengths of tapping screws are now set forth in the newly issued American Standard ASA B18.6.4-1958 from which the table on this page has been extracted.

USING A TORQUE-TESTING FIXTURE

Shown as illustration "A" is a torque-testing fixture made by P. A. Sturtevant Co. With this unit the ultimate torsional strength of a screw can be determined. The screw is held in a split collet having thread impressions of the same diameter and pitch. The screw is prohibited from threading through by a bottoming wall in the collet. The collet is securely clamped in the fixture locating it directly below the spindle. A suitable driving bit is attached to the lower end of the spindle and a torque wrench engages with the upper end. The spindle is held in a threaded sleeve by frictionless bearings and the bit can be engaged or disengaged from the screw by means of the spindle adjusting wheel attached to this sleeve. The height of the spindle from the table can be varied by raising or lowering the spindle arm on the post which can also be raised or lowered for further height adjustment.

CHECKING TORQUE OF TAPPING SCREWS

The use of tapping screws is constantly expanding. Engineers appreciate the cost savings and quality improvement derived from their use. Tapping operations are eliminated. Because of the greater strength of the screw, it can be driven much tighter than an ordinary machine screw and results in a more secure fastening. Since the screw produces its mating threaded hole, loose fits and wobble of the screw in the hole are practically eliminated. They are being successfully applied in steel, aluminum (rolled, extruded, cast or die-formed), cast iron, die castings, plastics of most types, resin-impregnated plywood, asbestos, glass fibers, etc.

continued

MINIMUM TORSIONAL STRENGTH—INCH LBS.

Screw Size	Type of Thread					
	A	B*, BF[1], BT[6], BG[2]	C		D[3], F, G & T[4]	
			N.C.	N.F.	N.C.	N.F.
2	3	3	5	6	5	6
3	8	8	8	9	8	9
4	11	12	12	14	12	14
5	17	17	17	19	17	19
6	20	22	21	25	21	25
7	28	28				
8	36	36	39	44	39	44
10	45	52	52	69	52	69
12	78	82	87	101	87	101
14	117					
¼		133	132	168	132	168
16	142					
5/16		270	285	347	285	347
18	183					
⅜		550	525	664	525	664
20	234					
24	460					

*Otherwise designated as Type Z
[1]Otherwise designated as Type FZ
[2]Otherwise designated as Type H
[3]Otherwise designated as No. 1
[4]Otherwise designated as No. 23
[5]Otherwise designated as No. 25

Extracted from American Standard Slotted and Recessed Head Tapping Screws and Metallic Drive Screws ASA B18.6.4-1958) with permission of the publisher, The American Society of Mechanical Engineers.

Each application—because of environmental conditions such as hardness and kind of material, length of thread engagement, diameter and pitch, as well as type of tapping screw—requires an investigation to determine the proper hole size in the work piece.

DETERMINING HOLE SIZE

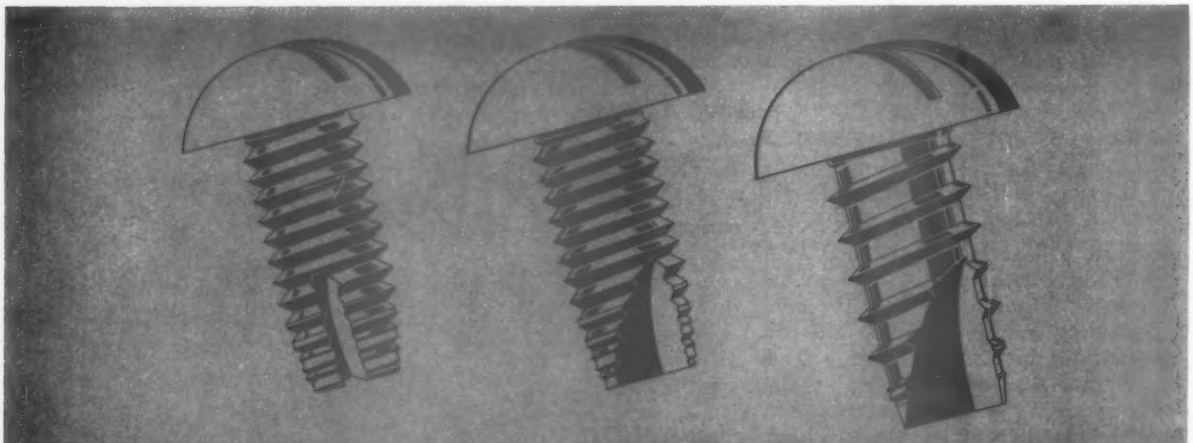
In determining the proper hole size for a specific application of a tapping screw, a sample of the material into which the screw is to enter, and sample screws, must be obtained. Using the hole size tables set forth in the Appendix of American Standard ASA B18.6.4-1958 as a basis, holes as given, also next drill sizes smaller and larger, are drilled into the test piece. If the test piece is in the form of a strip, the square anvil illustrated can be used by clamping it into the fixture. This will prohibit the strip from turning with the screw as torque is applied. Test pieces can also be held in a small vise, or, if irregular in shape, may even be clamped to the base of the fixture. Tee slots are provided in the fixture for this purpose.

APPLYING THE TORQUE

Using a washer to represent the part to be held on by the screw, the screw is driven into the drilled hole with readings taken of the maximum torque required. Setting the screw down tight on the washer, torque is applied until a failure occurs. A failure may be either the thread in the work piece strips or the screw breaks. The torque required to cause failure is also read. Having three different diameters of holes, different values of driving and failure torques will be determined from which the best hole size can be selected. The driving torque required should be of a reasonable value in relation to the size of the screw. The corresponding failure torque should be at least three times as great as the driving

continued

Results of test conducted to show how torque testing aids in selection of correct tapping screw and hole size



HOLE		TORQUE — LB.-IN.								
		Type 1			Type 23			Type 25		
Drill	Dia.	Drive	Ult.	Fail	Drive	Ult.	Fail	Drive	Ult.	Fail
25	.1495	11.6	63	5S	9	59	5S	7.2	49	5S
26	.147	15.6	71	1S 4B	10.8	59	4S 1B	7.2	57	5S
27	.144							8.4	67	5S
28	.1405							13.2	70	1S 4B

* "S" denotes threads stripped from hole; "B" denotes screw broke.

Problem:

"Fasten thin metal parts where countersinking is impractical. Product is to have smooth, streamlined surface, so fastener head must be low and rounded. Fasteners must be removable . . . must stand up under repeated removal and re-tightening . . ."

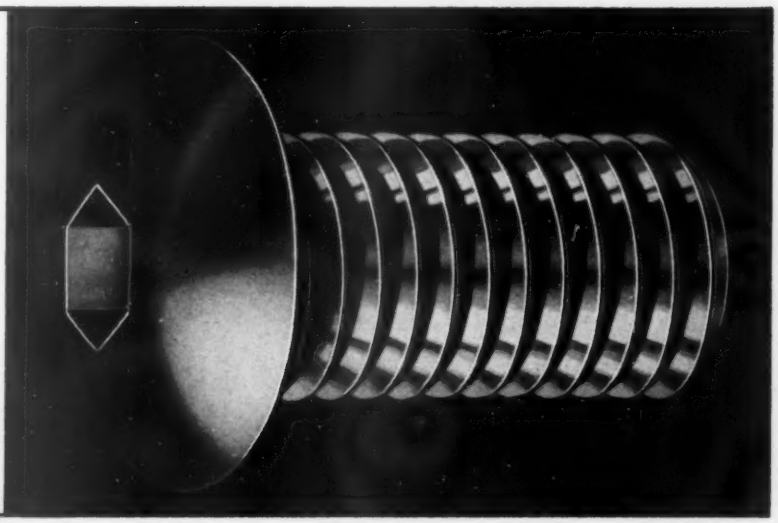


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Illustration A: With this torque-testing fixture the ultimate torsional strength of a screw can be determined. This fixture can also be adapted to checking the torsional holding strength of a small gear riveted to a shaft.

Illustration B: Here is a setup for determining the type of tapping screw and the proper hole size in a die casting of irregular shape. The material is an aluminum casting to which a cover plate 1/8 inch thick is to be attached.

torque to take care of variations of torque applied on the assembly line. A study of the actual test results permits this selection to be made.

Illustration "B" shows a typical setup for determining a proper hole size in a die casting of irregular shape. Here a cover and gasket are to be attached to a housing by means of tapping screws.

SELECTION OF SCREW TYPE

Here is an example of how the Sturtevant torque testing fixture assists in the selection of type of tapping screw and the proper hole size. Screws under consideration were Types 1, 23 and 25, originated and manufactured by the Shakeproof Division.

The material was an aluminum die casting of the actual part to which was to be attached a cover plate 1/8 inch thick. The screws selected were cadmium-plated No. 8 size, 7/16 long, giving 5/16 thread penetration into the casting. Each value given in the table is an average of five tests.

Normally, soft No. 8 machine screws are driven at 18-20 pound-inches torque. This information is of value in analyzing the accumulated data. Considering the Type 1 Screw, the No. 26 drill hole is too small because of the relatively high driving torque and four failures due to screw breaking. The No. 25 drill hole is a better selection because of the lower driving torque and type of failure. The ultimate driving torque is quite high, permitting considerable variation in application torques and still permitting a much tighter joint than is possible with a machine screw.

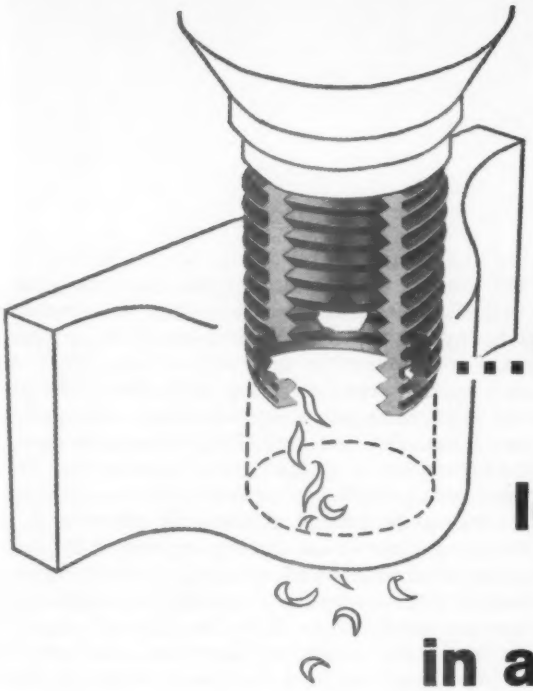
Considering the Type 23 Screw, the selection of the No. 25 drill hole gives a lower driving torque and a slight reduction of ultimate torque, although this value is still considerably above that required.

HOLE SIZE VS. TORQUE

The data concerning the Type 25 Screw shows considerable variation of hole size possible with relatively little effect on the torque values. By selecting the No. 27 drill hole, we attain a relatively low driving torque to produce the mating threads in the die casting. We also get a high ultimate failure torque for secure fastening with a minimum chance of failure through overdriving. Because of the extra strength in the screw over that of a machine screw, greater applied torque will result in a more secure fastening. The holes may be die-cast and the normal tapping operation, together with its inherent costs of taps, plug gages and inspection, are eliminated, thereby reducing the manufacturing costs.

OTHER APPLICATIONS

The torque-testing fixture can also be adapted to checking the torsional holding strength of a small gear riveted to a shaft, as is usual in clock and instrument design. Torsional reactance of clock springs or other types of torsional springs, may be measured with this unit. •



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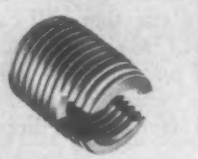

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H-Series:— A heavy walled insert with truncated root external thread and three-hole cutting edges for hard-to-tap higher-strength materials and to meet MIL and other specs calling for Class 3B thread fit for gaging after installation.

W-Series:—Coarse-pitch external thread offers maximum strength; permits installation in small wooden sections without splitting. For furniture, cabinets and other wooden parts where strong, permanent threads are required.

P-Series:—This Tap-Lok insert was designed to eliminate thread wear and renew damaged threads in spark plug sockets in aluminum cylinder heads. It is available from stock for standard plug sizes to meet most needs.

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TENSILE AREA OF THREADS

by **H. Schlarman**, M. E.

An objective discussion of those aspects of thread tensile area which are subject to confusion or uncertainty

THE thread tensile area is the keystone increment in any threaded fastening computation and design. Nevertheless, there seems to be no single source, comprehensive and authoritative text on thread tensile areas covering definitions, identification, types of tensile areas, standards of suitability or use relative to: materials, PSI, thread processing, and end objective of the tensile calculation. This article is not intended to represent such an authoritative text or be critical. Rather, the objective is to present a picture of the various aspects of the subject that are conducive to confusion and uncertainty.

Thread tensile areas are specified or referenced in various publications. However, the information given is usually scanty to the point of where "a little knowledge can be a dangerous thing." A comparison of the specifications and use of tensile areas can lead to considerable questioning.

The tensile area is a first consideration and factor in functional tensile strength calculations and dimensional design of a threaded fastening. The tensile area is a basic value required to convert the operating tensile load into tangible fastening design attributes. In short, the tensile area used influences and limits the diametral and axial dimensions of the fastening and thereby also the weight.

The importance of the tensile area in threaded fastening design can be more clearly established by a study of the major steps involved in a primary design of an average boss anchored bolt fastening. Assuming that the mating part materials and the increment load on the individual fastening have been established, the further design considerations would normally follow as sequenced below:

1. The load on the fastening must be converted into a bolt thread size that will have a tensile strength sufficient to withstand the tensile load. The thread material PSI and the tensile area are the two values required to calculate the thread tensile strength and thereby establish the thread size.
2. From this thread size is established the parent boss diameters.
3. Using the thread size, the thread (shear) engagement required to prevent thread stripping or pullout under the governing tensile load is computed.
4. This computed length of thread (shear) engagement is the prime value required to establish the parent boss depth of the tapped end, and to complete the design of the fastening.

It will be noted that all the dimensional attributes of the boss envelopes are contingent on the load reflecting thread size established as the product of bolt material PSI and thread tensile area. Material PSI

present no problem to the fastening designer because this data is an inherent part of any material specification. This finite condition is largely absent with respect to thread tensile areas. Fastening specifications may or may not indicate the thread tensile area on which the given bolt thread strengths are based. When this type information is not available, and even when it is, there can be considerable design confusion as to the application of the thread tensile areas as will be pointed out later in this article.

Since neither oral nor written discussion of the subject is possible without a common understanding of terms, and since there seems to be a dearth of established definitions and means of identification, license has been taken to establish such as are required for purposes of this article. They are as follows:

DEFINITION OF TERMS IN DISCUSSION

1. Tensile Area: a real or assumed cross sectional area of a thread subject to axial tension.
2. Root Area: the area equivalent of a solid minor diameter cylinder.
3. Tensile Stress Area: an empirically established or assumed tensile area, greater than the root area, whose use in theoretical tensile strength computations will result in values closely approximating test failure strengths.
4. "Mean" Stress Area: the area equivalent of an assumed solid cylinder diameter equal to the average of the mean pitch and minor diameter limits.
5. Mid-Dedendum Stress Area: the area equivalent of an assumed solid cylinder diameter equal to the mean of the pitch and related minor diameter.
6. P.D. Stress Area: the area equivalent of an assumed solid cylinder diameter equal to the pitch diameter.
7. Mid-Addendum Stress Area: the area equivalent of an assumed solid cylinder diameter equal to the mean of the major and pitch diameter.
8. Major Diameter Stress Area: the area equivalent of an assumed solid cylinder diameter equal to the major diameter.

It will be noted that in the definitions the term "stress area" is applied only to those areas based on a diameter at which there is an assumed but no factual solid cylinder of thread section. In contrast to this, the root area represents a factual solid cylinder cross section or the core area of the thread.

Root areas can be calculated from either the thread specification or the measured root diameter of the thread. Either method would be satisfactory and equivalent for most practical tensile strength computations involving the root area.

Stress areas, however, are derived and established from mechanical strength tests. A thread tensile strength based on the root area would reflect only the strength of the thread core; a strength based on an area identified as a "stress area" would reflect the sum of the core strength and the strengthening effect thereon of the thread form coil.

The accompanying drawing graphically illustrates the various tensile areas of a thread. Currently specified or used tensile areas do not include those areas larger than the pitch diameter equivalents; however, the larger areas are shown for reference.

It will be noted that the tensile areas are based on the diameter equivalents of basic thread depth (h) limits or increments thereof. Within the limits of the thread depth, the governing diameters are the equivalents of h/4 increments. The currently established tensile areas are the root area, the mid-dedendum and P.D. stress areas.

VARIATIONS IN USE OF TENSILE AREA

The variations in the specification and use of tensile areas will be evident from a comparison of the following:

A. Screw Thread Standards for Federal Services: Mid-dedendum tensile stress areas were included in the Unified thread specifications in the 1950 Supplement to H28 (1944) and are also in H28 (1957). The 1950 issue stress areas were based on the "Mean" formula; the 1957 issue areas are based on the formula previously published in the S.A.E. Handbooks. The practical end calculation difference between the "Mean" and S.A.E. derived stress areas is negligible.

B. S.A.E. Stress Area Formula:
This formula provides a mid-dedendum stress area. S.A.E. recommends that in the formula, the pitch diameter used be basic for steels up to 100,000 PSI and that the minimum pitch diameter be used in the area calculation for steels exceeding 100,000 PSI. The root diameter increment of the formula is established relative to the pitch diameter.

C. ANC-5 (March 1955), Strength of Aircraft Elements:
1. Table 2.6111 (a): The tensile strength values shown in this table for AN-3 thru AN-20 bolts (125,000 PSI) indicate the use of the root area.
2. Table 2.6111 (b) "Strengths of Internal Wrenching Bolts" (160,000 PSI): strengths are based on the 3A MIN. root areas.

D. MIL-B-6812 (Jan. 1952), Bolts Aircraft: This publication specifies the root area.

continued

E. NAS 1103-1120 Type Bolt Specifications:—The mid-dedendum stress areas are indicated by the specified test minimum tensile strength. NAS 1103-1120 covers bolts of 160,000 PSI commonly used for 125,000 PSI applications.

F. MIL-B-7838A, (30 April 1952) Bolt-Internal Wrenching, 160,000 PSI.
The tensile strengths shown in Table IV are based on the P.D. stress area. This specification covers 160,000 PSI bolts. The PSI limits of 160,000 PSI bolts are normally 160,000—180,000 PSI.

G. NAS 496 (1 March 1950) Specifications, Bolts, Internal Wrenching:
(1) For tensile strength calculations the tensile area to be used is specified as quote: "area at pitch diameter of thread except for ¼ and 5/16 bolts 98% of pitch diameter is used." This is a P.D. stress area.
(2) In the fatigue strength test section the loading is based on the root area.

H. FF-B 571a.—(Jan. 9, 1934) Federal Specifications for Bolts, Studs, etc.: Tensile areas to be used are specified as quote:
"In determining the tensile strength of bolts, studs, or tap rivets, the effective area will be the cross sectional area based on pitch diameter for ferrous materials and on minor diameter for non-ferrous materials."

It is not the intention of this article in referencing the preceding publications, to question the applications of the various tensile areas involved as suitable to the objective, but rather to present a picture of possible variations and/or conflictions in the specification and use of tensile areas. In view of the governing limits, lack of such limits, and/or applications of tensile areas in the preceding references, it is conceivable that there can be questions relative to the interpretation, limits and use of tensile areas.

CALCULATED TENSILE STRENGTHS, 3/8-24 THREAD

SECTION 1. TENSILE STRENGTHS

THREAD TENSILE AREAS	TENSILE STRENGTHS (lbs.) AT MATERIAL PSI	
	125,000-145,000	160,000-180,000
(a) .0878 (Mid-Deden. Stress)	10,975-12,731	14,048-15,804
(b) .0951 (P.D STRESS)	11,888-13,790	15,216-17,118
(c) .0809 (ROOT AREA)	10,113-11,731	12,944-14,562

SECTION 2. CALCULATED MAX & MIN. PSI POSSIBLE FOR SECT 1(a) & (b)

TENSILE STRENGTHS IF TENSILE AREAS ARE REVERSED

TENSILE STRENGTH	STRESS AREA	RESULTANT PSI	REF. PSI PER SECT. 1
(a) 10,975	.0951	115,400 }	125,000-145,000
(b) 13,790	.0878	157,000 }	
(c) 14,048	.0951	147,000 }	160,000-180,000
(d) 17,118	.0878	195,000 }	

A comparison of the references "A" thru "H" can lead to considerable questions and confusion on the part of the designer. To illustrate, some examples:

1. H28 and S.A.E. indicate the use of the mid-dedendum stress area for such specifications as MIL-B-7838A which, however, is based on the P.D. stress area.
2. H28 and S.A.E. (mid-dedendum area) are in seeming confliction with NAS 496 and FF-B-571a (P.D. stress areas for steel) and MIL-B-6812 (Root area).
3. ANC-5 strengths of steel bolts are based on the root area which conforms with neither H28, SAE, NAS 496 or FF-B-571a and is in direct confliction with FF-B-571a which specifies that root areas are to be used for non-ferrous materials.
4. Although ANC-5 —Table 2.6111 (a) and NAS 1103-1120 are publications effective on the same branches of service, different tensile areas are used for the same PSI (125,000) condition. The former specification uses the root tensile area whereas the latter uses the mid-dedendum stress area.
5. Although MIL-B-7838 and Table 2.6111 (b) of ANC-5 both give strengths for 160,000 PSI internal wrenching bolts, the strengths of the former are based on P.D. stress areas while those of the latter are based on root areas.

The above exemplify only a few points of variation and question. Many more "whys and wherefores" could result from a detailed study of the subject.

CONSIDERATIONS ON USE OF TENSILE AREAS

The possible conflictions of specifications and variations in the use of thread tensile areas relative to material and PSI is not the only consideration. In no publication does there seem to be any consideration or instructions on the use of tensile areas relative to the immediate calculation objective. These objectives can be the calculation of thread tensile strength, determination of thread size, computation of shear engagement (equivalents: stripping or pull-out strengths) required to sustain a given tensile load, or the PSI of a thread material induced by or resulting from a given load.

It does not follow that the tensile area used for one immediate calculation objective can or should be used for another interlocking or related calculation objective. For instance, while the mid-dedendum stress area might be used to calculate bolt strength in establishing thread size, a bolt strength based on a P.D. stress area may be advisable in calculating the thread shear engagement or pullout because such values are usually calculated to provide a positive factor of safety especially where the failure strength of the prime external nut thread must be developed. Further in computing PSI from a given strength (such as a tensile test strength) the difference in

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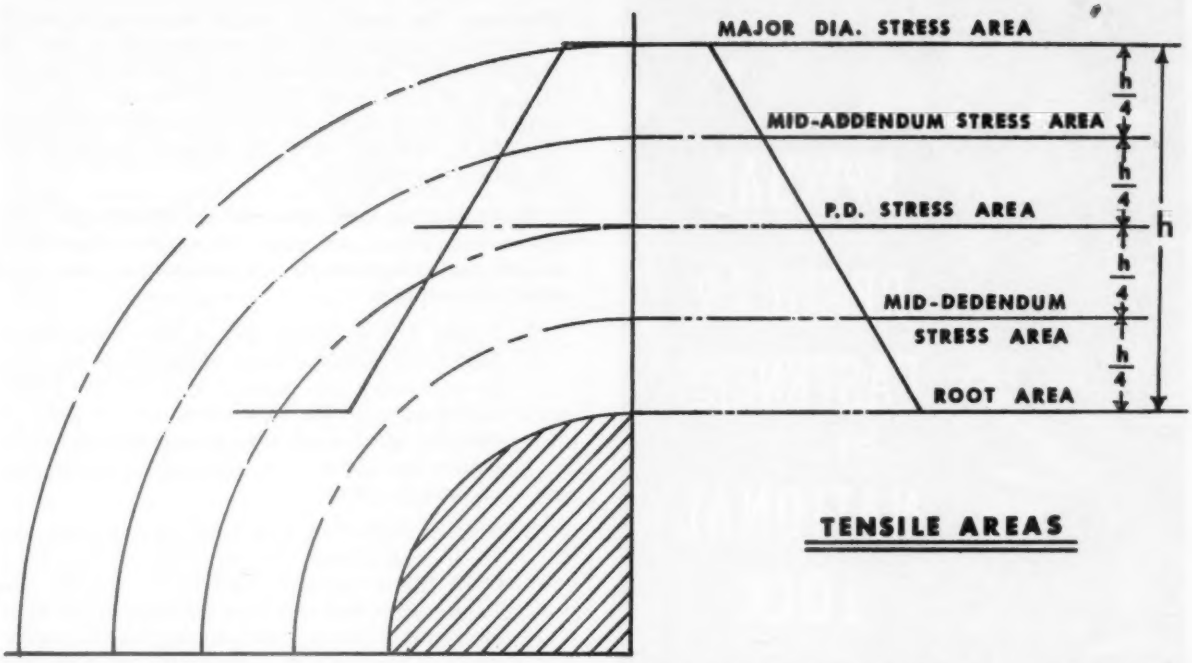

Illustration of the various tensile areas of a thread. Currently specified or used tensile areas do not include those areas larger than the pitch diameter equivalents. However, the larger areas are shown for reference.

calculated PSI resulting from the use of the individual tensile areas will vary considerably.

The accompanying table was set up for more specific discussion of the preceding points. The table reflects a common thread size, common PSI limits and mid-dedendum and P.D. tensile areas.

Section 1 shows the calculated thread tensile strengths resulting from the various combinations of tensile areas and PSI.

EFFECTS OF THE CHOICE OF TENSILE AREA

To illustrate the effect the choice of tensile area may have on determining the thread size equivalent of the acting tensile load, let us suppose that it is required to establish a 125,000—145,000 PSI bolt size that will withstand a 12,000 lb. tensile load. Insofar that good design practice dictates that the minimum tensile strength of the bolt thread should nominally equal or exceed the maximum tensile load, it is evident from Section 1(a) that if the tensile strength is based on the mid-dedendum stress area, the 3/8-24 thread would not satisfy the design condition and the next and heavier 7/16 thread bolt would be indicated. However, if the tensile strength is based on the P.D. stress area—per Sect. 1 (b)—the 3/8-24 bolt would appear satisfactory since its calculated minimum tensile strength closely approximates the maximum tensile load (12,000 lbs.). In this respect it can further be pointed out that the 3/8-24 bolt would be ruled out by tensile strengths given for the 3/8-24 in both ANC-5 (10,100 lbs.-root area) and NAS 1106-1120 (10,950 lbs.—mid-dedendum stress area).

Another calculation involving tensile areas is the computation of Material PSI from test tensile strengths of such threaded fasteners as bolts and studs. These type fasteners do not normally provide enough grip length to establish the PSI of the unthreaded diameter. Unless unthreaded test bars are available, the test tensile strength is usually that of the thread and the material PSI is computed therefrom. Sect. 2 shows the calculated PSI of some of the tensile strengths if computed by reversing the tensile areas used in Sect. 1. The difference between Sec. 1 and Sec. 2 PSI can be considerably greater because the test strength is usually greater than the calculated tensile strength of the thread. It would take only about 500 lbs. over-calculation test strength (using the mid-dedendum stress area) to throw Sect. 2 (b) PSI into the 160,000 and Sect. 2(d) PSI into the 200,000 categories. In any such calculation the test strength is an established value; the variable factor in this case is the tensile stress area and any question relative to the resulting PSI will eventually focus on whether or not the stress area used was efficacious.

The calculation of shear engagement is a very important part of threaded fastening design. In this also the tensile stress areas used have a major effect on the fastening design. For instance, the thread size would normally be established relative to the MIN. calculated strength of the bolt thread. This might be based on the mid-dedendum stress area.

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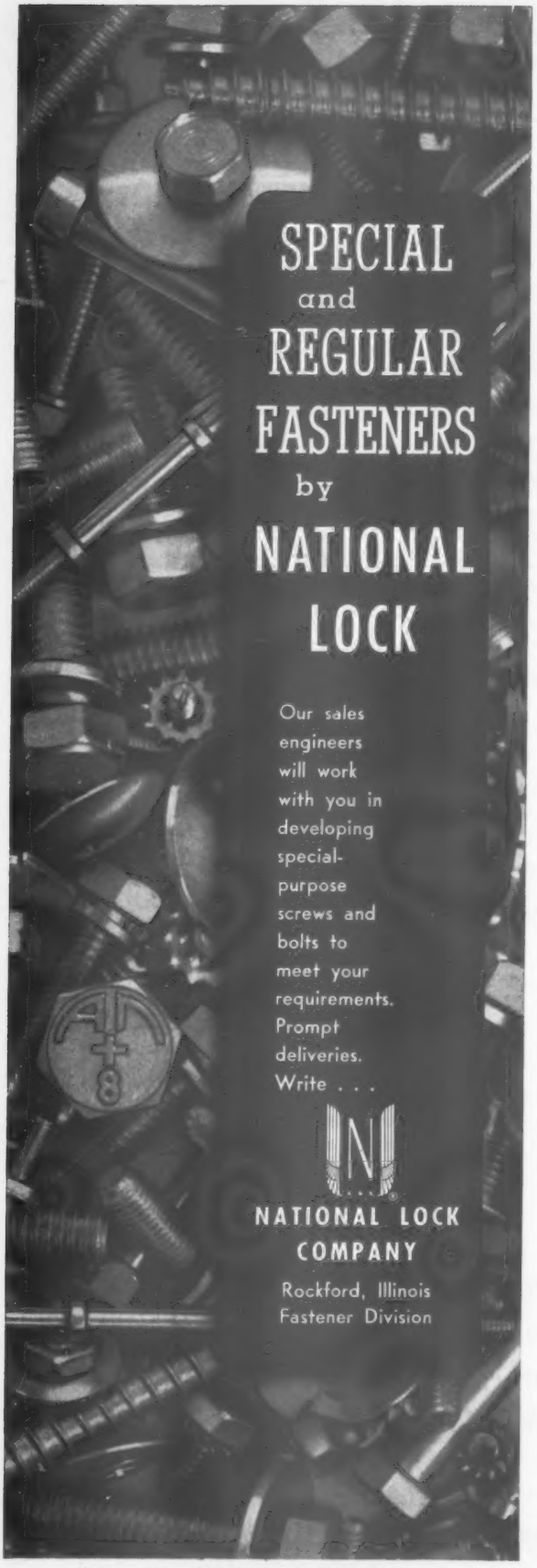

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Tensile Area of Threads, continued

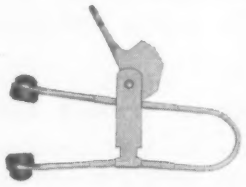
However, the length of thread shear engagement required to develop the full test strength of the bolt thread should be computed from the MAX. tensile strength of the thread. This might be best approximated by using the P.D. stress area for calculating the MAX. strength on which to base the shear engagement computation.

The following will illustrate the effects that tensile stress areas can have on shear engagement length and consequently on the fastener and boss axial dimensions:

1. If the 3/8 external thread was installed in 356T6, the length of shear engagement required to withstand the pullout load of the MAX. strengths per the PD stress area would be roughly .050 longer than that required by the equivalent per the mid-dedendum stress area of Sect. 1, Table 1.
2. For the individual PSI limit combinations, the shear engagement length required for Sect. 1 (b) MAX. strengths would be roughly .135 longer than that required by Sect. 1 (a) MIN. strengths to provide the pullout potential equivalent of the individual strength. The length of shear engagement affects the pullout, overall length and weight of the fastening.

WEDGELOCK Klip-Klamp

LOCKS IN 5 POSITIONS

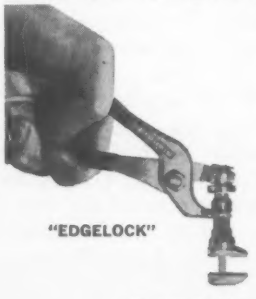


This fast-acting klamp sets and locks in 5 distinct positions—releases easily by simply flipping the cam lever.

Overall length 4½". Holds material thickness from 0 to 1". Jaw depth 2". Nickel plated. Replaceable rubber jaws prevent marring work surfaces. Holds materials securely while sawing, drilling, soldering, welding, gluing or laminating.

High Tension Spring Clamp

A low cost spring clamp for holding edges of two or more thicknesses of wood, metal, plastic, fiberglass and other workable materials. Known as the "EDGELOCK", the clamp has a gripping capacity of 65 lbs. Jaw openings up to 1", weight is approximately 1 oz., over-all length is 2¼". The spring is completely enclosed for protection to the operator as well as to the clamp itself. The EDGELOCK is set and released with clamp-setting pliers.



"EDGELOCK"

A Product of

WEDGELOCK CORPORATION
5440 Satsuma Ave.
North Hollywood, Calif.

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From the aforegoing, it should be understandable that judgment is required in the choice and use of tensile areas if controversy and/or possible fastening failure are to be avoided.

This article has merely scratched the surface of the subject. Many more questions may be asked such as: what tensile areas are valid for aluminum, titanium, and high temperature-high strength material threads; are current mid-dedendum or P.D. stress areas valid for calculating thread tensile strengths when such strengths are computed on the PSI of the material under a specified time-high temperature condition; and do the stress areas reflect the strengthening effect (considered to be approximately 15%) of thread rolling, the type of thread processing commonly stipulated by military specifications.

In view of the importance and effect that thread tensile areas have on the functioned capabilities and dimensional attributes of a threaded fastening, the confusion currently possible, the condition of personnel turnover in and between the various branches of industry, and the increasingly exacting requirements imposed on threaded fastenings, it would seem pertinent that thread tensile areas and their applications should be clarified and standardized by a comprehensive specification of some authoritative agency. •

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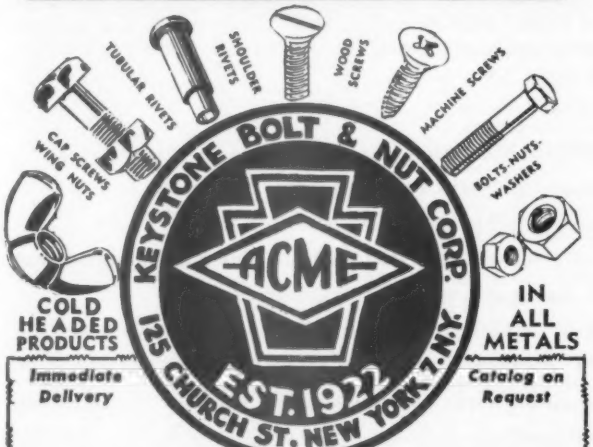
For Every IMPORTANT FASTENING



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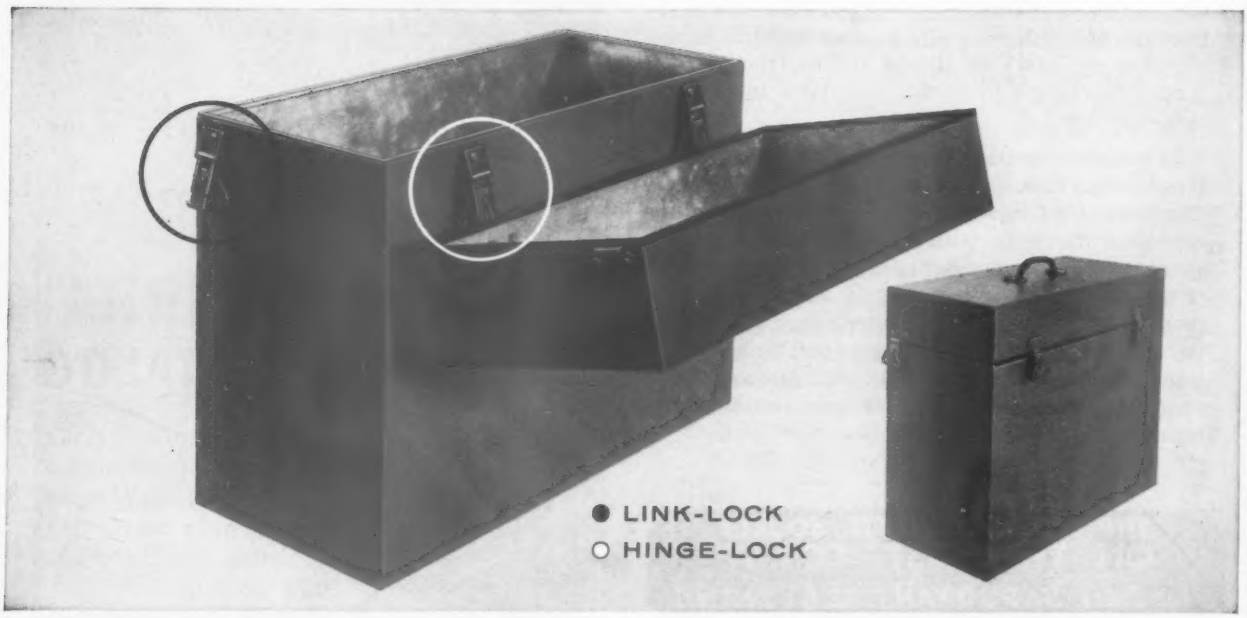

No. 3 LINK-LOCK

No. 3 HINGE-LOCK

Two HINGE-LOCK and two LINK-LOCK Fasteners provide all-around sealing pressure on this container manufactured for the U.S. Navy by the Bonded Structures Division, Swedlow Plastics Company.

The new Simmons HINGE-LOCK, used in combination with LINK-LOCK, provides an even, pressure-tight seal on equipment containers and transit cases with hinged covers. A half-turn applies pressure to both types of fasteners. When pressure is released HINGE-LOCK becomes a free-operating hinge, and LINK-LOCK disengages to permit opening.

Originally developed by Simmons Fastener Corp. for the Engineering Department of Swedlow Plastics Company, Bonded Structures Division, HINGE-LOCK is similar in principle and appearance to LINK-LOCK. Both are available in light and medium duty sizes as matched hardware. LINK-LOCK is also available in a higher-capacity, heavy-duty size.

SEND TODAY for complete data, including dimensions, capacities. Engineering service is available... Outline your requirements. Samples on request.

See our 8 page catalog in Sweet's Product Design File

SIMMONS FASTENER CORPORATION 1796 North Broadway, Albany 1, New York

QUICK-LOCK • SPRING-LOCK • LINK-LOCK • HINGE-LOCK • ROTO-LOCK • DUAL-LOCK

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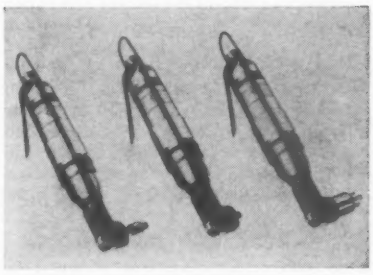
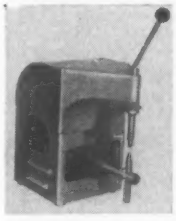
WHAT'S NEW IN EQUIPMENT

For information on any equipment listed here, use the postpaid card opposite page 48. Just circle the number on the card matching the number following the description. We'll do the rest.

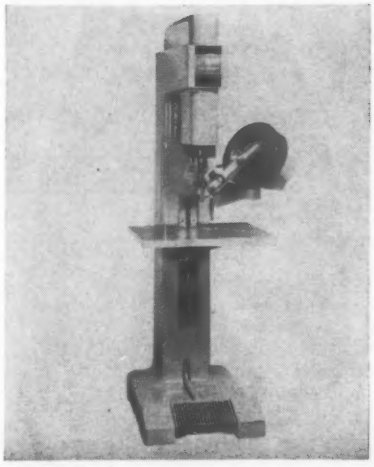


(See 101)



(See 104)

(See 102)



(See 105)

AIR TOOL SERIES DESIGNED FOR DRILLING, ASSEMBLY

Air tools designed for drilling or assembly in close quarters range in weight from 2¼ lbs. to 3⅜ lb., feature sturdy construction with ball bearings to prolong tool life.

The new angle drills, nut setters and screw drivers are available in five sizes with speeds from 3200 rpm to 450 rpm. With identical motors in each, the optional attachments available for each are interchangeable. Zerol bevel gears and splined drives are used.

The 12L-2 Series screw driver handles machine screw sizes from No. 6 to ¼". The 16L-2 nut setters range from No. 6 to ¼" machine nuts.

Gardner-Denver Co., Quincy, Ill.

Use postpaid card. Circle No. 101

PNEUMATIC STAPLER HAS AIR RETURN, SPEED PISTON

Two stapling tool improvements—air return and high-speed piston—are combined for the first time in the Model AR air-power staplers.

Jet driven air return delivers positive high speed action, extends tool life and eliminates parts most subject to failure in any stapler. High speed nylon piston drives staples without recoil. AR Staplers take wide and narrow crown staples in leg lengths from 3/16" to ¾".

Paslode Co., 5860 Northwest Highway, Chicago 31, Ill.

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DEVELOP ADHESIVES FOR BONDING TREATED TEFLON

Two adhesives made of two-component materials systems (base and activator) will bond etched Teflon to wood, steel, glass, aluminum, ceramics, plastics or any other adhesive bondable material.

Ray-BOND R-86009, providing bond flexibility, has good resistance to water and most chemicals. It can be used as a structural adhesive up to 120° F, on non-structures up to 250° F. Ray-BOND R-86044 features resistance to acids (except acetic) and other chemicals. Its temperature limitations are 200° F and 250° F. Bond may be cured at room or elevated temperatures.

Raybestos-Manhattan, Inc., Bridgeport, Conn.

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SPOT WELDING EASE WITH CAM-LEVER ACTION

Ease of operation and flexibility are offered in press type spot welder for light assembly operations. Model R-600 one kva bench welder is available in 110 or 230 volt capacities.

The cam-lever acting precision welder is 9" x 15" and 14½" and produces required high pressure with minimum effort. Unit makes good spot welds on mild or stainless steel through 26 gauge and cross-wire welds through two pieces of 3/12" clean steel wire. Pressure is applied in a straight line, giving a better weld and preventing skidding of aligned parts.

A heavy-duty pass-through contactor turns welding current on and off automatically.

Peer, Inc., 1200-1248 Milton St., Benton Harbor, Mich.

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SCREWDRIVER CLUTCH PERMITS EVEN TORQUE

A magazine-fed power screwdriver claiming great accuracy and flexibility for use in assembly operations embodies a new type of positive control clutch, hopper-driving mechanism, feed track and solenoid operated escapement mechanism.

The Model U has a driving range of from No. 6 x 3/16" long to No. ¼ x 1½" long screws. The clutch involves no friction devices and permits constant torque. It is unaffected by temperature changes or excessive oil or grease and is adjustable from a minimum of 15 inch lbs. to 120 inch lbs., holding a tolerance of plus or minus 2 inch lbs. at the lower range to plus or minus 6 inch lbs.

It is available either as a floor model

or as a self-contained driving head for use in automatic assembly machines incorporating straightline transfers, etc.

Detroit Power Screwdriver Co., 2809 W. Fort St., Detroit, Mich.

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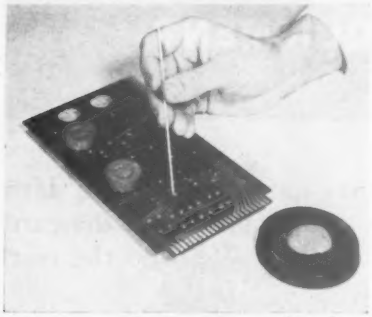
CONDUCTIVE CEMENT BONDS ELECTRICAL COMPONENTS



A new conductive cement, based on epoxy resins, is said to offer excellent bond strengths to most materials and is recommended for repair of printed circuits and for bonding of electrical components where soldering can not be tolerated.

Hysol 6250 is 100% solids and has volume resistivity measured at .01 ohmcm at 25° C. The compound will cure fully in 24 hours at room temperature or in two hours at 140° F. It is supplied in kit form.

Houghton Laboratories, Inc., Olean, N.Y.

Use postpaid card. Circle No. 106

LIGHT SOLDERING IRONS HAVE HEAT CONTROL TIPS

Three ultra-lightweight soldering irons feature built-in temperature controls inside the soldering tip which automatically maintain correct temperature, preventing overheating, reducing radiation loss and increasing efficiency.

Ranging from 40 to 120 watts, the models temperature controller is protected by a sheath of stainless steel. The irons are one-half the weight of uncontrolled irons. They have plastic handles and flexible power cords. The 40-watt model is designed for low-temperature use, 60 for medium, 120 for heavy electrical soldering.

Weller Electric Corp., 601 Stone's Crossing Rd., Easton, Pa.

Use postpaid card. Circle No. 107

SULPHUR COPPER ALLOY FOR PARTS, COMPONENTS

Designated OFHC Sulpher Copper, an alloy has a machinability rating of 90, electrical and thermal conductivity of 96% of that of OFHC or ETP copper as compared to 90% for Tellurium copper. It is available in rods only.

For common fabricating processes the alloy has a hot working temperature of 1400-1600° F, annealing temperature of 750-1200°F and shows cold working characteristics comparable to pure copper. It is more ductile than Tellurium copper.

In corrosion resistance the alloy is comparable to pure copper and has proved satisfactory in resistance to "stress corrosion cracking."

Scovill Mfg. Co., Waterbury 20, Conn.

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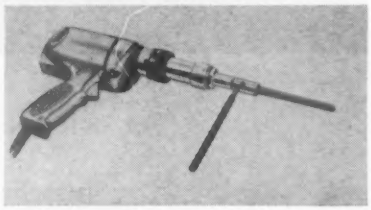
COMPACT ELECTRIC HAMMER HAS ADJUSTABLE IDLE



A ½" capacity electric hammer weighs just about four pounds and is equipped with adjustable blow and tool saving idling action. Compactness makes Model H-812A workable in overhead or close quarters.

Hammer impact is adjustable from light to heavy enabling operator to meet variety of job requirements. A twist of the knurled collar near the chuck sets force and blow and maintains it until reset. Motor idles when tool not actually on the work. Hammer furnished with six raw drills, two chucks and chisel, packed in steel carrying case.

Milwaukee Electric Tool Corp., 5366 W. State St., Milwaukee 8, Wis.

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AUTOMOTIVE and
AIRCRAFT QUALITY
screw machine parts
with "LOK-THRED"
"LOK-THRED" is self-locking, stronger, non-fretting, self-sealing and economical. Actually improves in service.
We specialize in difficult and complicated screw machine parts. High accuracy prototypes to multimillion production runs. All standard steels, non-ferrous metals or modern aircraft engine metals. Hardened and ground. Complete, modern equipment. Cooperative development engineering service.
Let us demonstrate the many advantages of "LOK-THRED". PHONE PRescott 5-6262.
MAYNARD MANUFACTURING CO.
22755 SHAKESPEARE, EAST DETROIT, MICH.

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Here are the features:

- **LIGHTNING FAST** . . . operating cycle: .025 of a second
- **CONTROLLED IMPACT** . . . from few lbs. to 10,000 lbs.
- **SAVES SPACE** . . . occupies less than a square foot of bench
- **VERSATILE** . . . used in staking, riveting, marking, swaging, etc.
- **MOBILE** . . . all electric, plug into any 115V line
- **SAVES MONEY** . . . economical price and operating cost
- **SAVES MAINTENANCE** . . . only two moving parts

Write today for free catalogue showing complete line of Electro-punches, automatic indexing table and accessories.

BLACK & WEBSTER, INC.
DEPT. 23, 445 WATERTOWN STREET, NEWTON 58, MASS.

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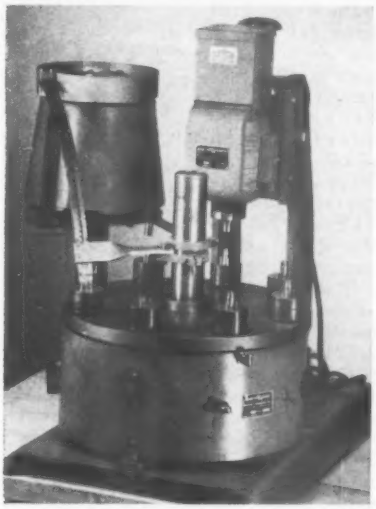
STAKER'S PUNCH RATED AT 10,000 LBS. IMPACT



Designed originally to speed the assembly of solenoid-operated valves, a ring staker can be adapted to a variety of other applications where controlled impact is desired. It is primarily used for staking the shading rings of solenoid armatures.

The machine consists of a Model C electropunch rated at 10,000 lbs. of impact, an indexing table and vibratory feeder. When used with a variable transformer, the impact can be reduced to a few pounds. Speed of feed is controlled by a variable resistor.

The six-station indexing table is powered by a 1/20 hp gearhead motor, controlled by an electric timer which comes in two ranges: adjustable from 14 to 54 indices per minute, or 6 to 24 indices per minute. Tables are available in 6, 8, 12 stations. All units run on 110 volts AC, 60 cycle, single phase current.

Black & Webster, Inc., 445 Watertown St., Newton, Mass.

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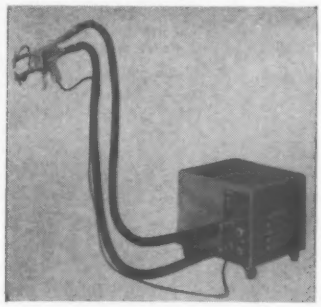
PORTABLE SPOT WELDER ADAPTABLE TO SIX GUNS



Portable spot welders, available in 16, 20, 30, and 40 kva models, feature adaptability. Equipped with automatic timer, heat control and contacter, the welder accommodates six types of standard guns: pinch type pistol grip, pinch type squeeze grip, single electrode with push type back-up lug,

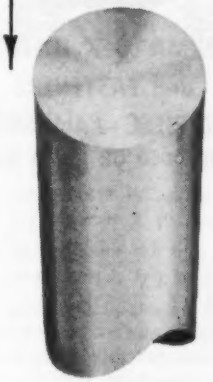
New Cap Fastener for Unthreaded Rod

PUSH OR TAP --IT'S ASSEMBLED

on plain round rods, axles, studs, rivets, pins, shafts

•

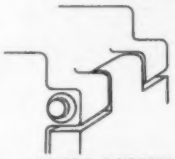
Saves cost of threading --notching--drilling for cotter pins



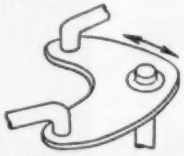
TYPE W PUSHNUT FASTENERS

Type W PUSHNUT Fasteners are made in one piece of heavy gauge tempered spring steel, with a special locking action that grips unthreaded rod and exerts powerful resistance to removal from 1/10 to 1/2 ton. On knocked down assemblies they are easily applied by tapping with a hammer. In factory assembly, readily applied by air hammer, press, or jigs for multiple assembly.

TYPICAL APPLICATIONS



HINGE ACTION
Rivet: Headed on one end, with PUSHNUT on other. Pin: PUSHNUT on each end.



PIVOT ACTION
Retainer on bell cranks or levers on integral studs or shafts.

CAPPED ASSEMBLY
Smooth, attractive assembly of parts not required or desired to be held under heavy tension or pressure.

HUB CAP WHEEL RETAINER
Attractive, reliable fastening of wheels on axles of all kinds of vehicles.

- Low in cost
- Easy, speedy assembly
- Rugged holding power
- Decorative, smooth, neat appearance
- Sturdy construction --will not dent or deform
- Always assemble in line --will not cock or misalign
- Variety of finishes
- Sizes for 3/16", 1/4", 3/8" and 7/16" dia.

Write for free samples, stating type, size and intended application.

THE PALNUT COMPANY, 79 Glen Road, Mountainside, N. J.
In Canada: P. L. Robertson Co., Ltd., Milton, Ont.

PALNUT® LOCK NUTS FASTENERS

PAL

Quick, secure fastening at low cost

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PERMA-LOCK INSERTS and FASTENERS

ONE PIECE — ALL METAL

THREADED OR PLAIN BORE

- No Threading—Cut Assembly Costs—Eliminate Parts—Simplify & Modernize Your Product.
- Merely press into drilled hole and it becomes a permanent part of your assembly
- Resilient Segments—Uniform Torque—For Fast—Economical—Sensitive—Self Locking Adjustments Under Extreme Vibration and Shock—For Screws—Pins—Shafts, etc.
- BRAKE: Cylindrical, Axial and Slide Movements.
- Wide Range of Styles, Sizes.
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STURTEVANT
TORQUE TESTING FIXTURE

FOR TESTING Screws, thread-cutting and thread-forming screws—all types of threaded fasteners; threaded parts and threaded connections.

FOR MANUFACTURERS
DESIGNERS
INSPECTORS
TOOL ENGINEERS
LABORATORIES and for
PRODUCT CONTROL
in assembly.

Capacities: (0-200 in. lbs.) or (0-150 ft. lbs.)

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P. A. STURTEVANT CO.
BOSTON QUALITY ILLINOIS

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double electrode push type, single electrode push type for drill press mounting without back-up lug, single electrode push type for special fixture mounting without switch or back up lug.

Adams Spotwelder Co., 237 Industrial Center Bldg., Sausalito, Calif.

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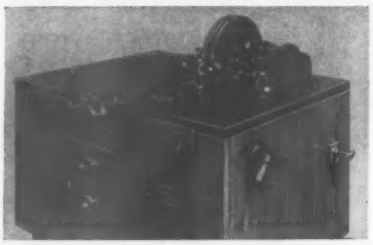
SOLID DIE COLD HEADER FORMS 120 PARTS A MINUTE



A standard solid die, double stroke cold heading machine will cut to length, head and form between 80 and 120 electrical contacts, rivets, pins and similar parts a minute.

The Omega "00" is designed to cold-head miniature parts as small as .012" diameter x .016" long. The maximum wire diameter accommodated is .070" with most alloys and up to .120" with soft aluminum. Part lengths may range from .016" to .400".

One-shot lubrication of the machine is provided. Supplied are one set of dies, coil reel, straightening rolls, feed rolls, built-in Vee belt motor drive and guards.

Robert E. Morris Co., Farmington Ave., West Hartford, Conn.

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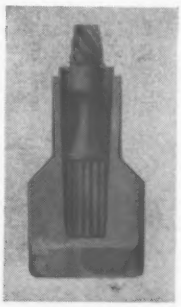
SOLVE SCREW EXTRACTOR BREAKAGE PROBLEM



The Wedge-Pruf screw extractor is now made in two parts to allow easy removal in case of breakage. The outer hexagon jacket is spline-fitted to the heat-treated high-alloy extractor, and shaped to allow maximum torque.

However, if the extractor should break, a portion now projects above the shoulder, eliminating the problem of having a hard-broken extractor engaged in the broken screw or fitting. Extractors are available in 25 sizes from ⅛" through ⅞" enabling users to remove all types of broken hydraulic or tube fittings and studs.

Roddick Tool Co., 1023 Pauline St., Anaheim, Calif.

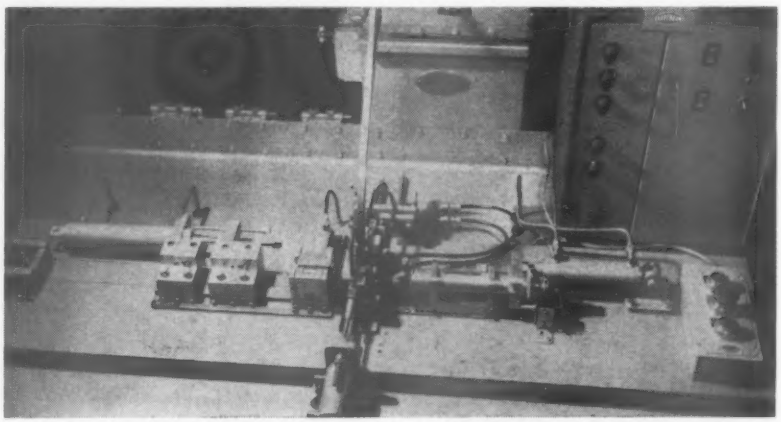
Use postpaid card. Circle No. 114

X-RAY INSPECTION IDEAL FOR ASSEMBLY LINE

An x-ray unit which amplifies an image onto a television screen has been introduced as an improvement to industrial quality control.

The image projected is several hundred times brighter than a conventional fluoroscope image and enables the inspector to work in normal light, instead of a dark room. The amplifier, x-ray generator and control comprise

PIGTAIL WELDER ASSEMBLES 3000 COMPONENTS HOURLY



Precision-welded "pigtail" assemblies are turned out at a rate of 3000 per hour on an automatic assembly and welding machine for electronic components production.

Formerly, pigtails were attached by mechanical staking machines and then soldered to ensure electrical connection.

Now lead wire is fed from reel to welding position, straightened and cut to exact length. Cups are fed from a vibratory hopper to welding position where both parts are welded and then ejected into a tote box beneath the machine. Current magnitude and duration are controlled by a heat program timer.

(Above picture shows vertical rotating head with four mounted fixtures. The induction pre-heating station is at top and can unload station at bottom. Weld is in process at No. 2 station.)

Raytheon Mfg. Co., 103 River St., Waltham 54, Mass.

Use postpaid card. Circle No. 113

the basic units, while a television monitor and movie camera (for permanent recording) can be used.

Products can be moved past the camera up to 12 feet per minute. Extra monitors can be placed in various locations to permit simultaneous viewing and the radiographer is completely removed from radiation exposure.

Picker X-Ray Corp., Cleveland, Ohio.

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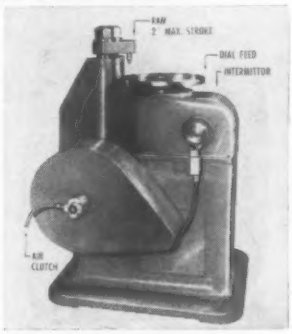
AUTOMATIC ASSEMBLY WITH DIAL FEED PRESS



An index table of the type used in rotary transfer machines has been integrated with a "dieing machine" type press with the crank below the table.

The Pressembler is designed for automatic assembly operations which include a press function: crimping, riveting or other forming methods or for dial fed secondary press operations.

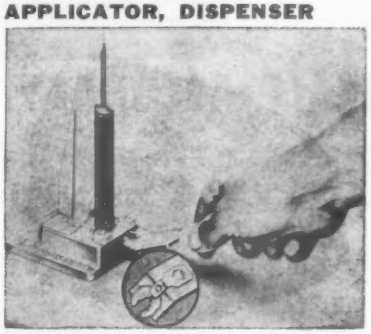
The line includes dials up to 18" in diameter with 4, 6, 8 or 12 stations on presses with capacities from 5 to 15 tons and strokes from ½" to 2" at speeds over 200 SPM.

Indexing by a roller gear drive with zero backlash and accuracy of .001" without auxiliary locking or locating methods is rated for a minimum of 8000 hours operation.

Ferguson Machine Corp. of Indiana, 7818 Maplewood Industrial Ct., St. Louis 17, Mo.

Use postpaid card. Circle No. 116

RETAINING RING APPLICATOR, DISPENSER



An applicator and dispenser have been designed to speed assembly of retaining rings.

The applicator is a hand tool to be used with either loose or dispenser-stacked rings. It is available in eight sizes for Prong-Lock ring size shafts from .092" to .438". The tool features

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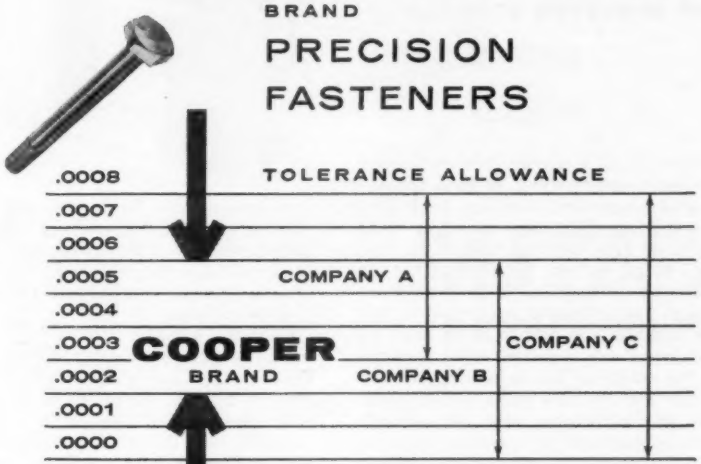


Your present fasteners may be causing you no reported breakdowns in your finished product, but what is the real story on your assembly line? Too many "headaches" there? Too much time spent on misfits that (like Fasteners A, B & C above) come "within tolerance", **but are actually unprofitable for you** because of time wasted?

Are you, in fact, "living with" problems that are costing you more than it would to **eliminate** them with better quality—Cooper brand quality—fasteners?

A Cooper specialist will be glad to help you avoid many of these headaches and needless costs. Our Metrology Laboratory is also ready to assist you with any of your screw thread problems. Just call us.

SPS WESTERN

2701 SOUTH HARBOR BOULEVARD, SANTA ANA, CALIFORNIA • Kimberly 5-9311

Division of Standard Pressed Steel Co., Jenkintown, Pa.
Use postpaid card. Circle No. 241

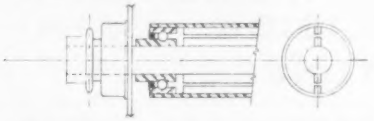
an angled steel blade with milled recess on the underside which enables installation of Series 5139 rings without turning the applicator.

Dispensers come in ring sizes 15, 18, 25,31. The dispenser consists of a weighted metal base which may be fastened to the top of a work bench and a bracket assembly with springtail.

Waldes Kohinoor, Inc., 47-16 Austel Pl., Long Island City 1, N.Y.

Use postpaid card. Circle No. 117

TORQUE LIMITING ROLLERS FOR CONVEYOR STOP-RUN

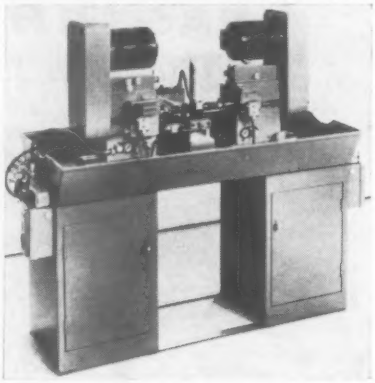


Material on a moving powered roller conveyor can now be stopped for assembly, inspection, labeling, packaging or marking while the conveyor continues to run, through the use of new fluid filled rollers. No damage to the conveyor or material will result even though the conveyor continues to run and considerable time is saved since no shutdowns are required when material on the conveyor has to be stopped. The torque that the new roller will transmit can be limited to only the amount actually required to maintain material flow and therefore material can be held back when necessary with the least possible effort.

Harry J. Ferguson Co., Jenkinton, Pa.

Use postpaid card. Circle No. 118

TWO-SPINDLE HORIZONTAL OPPOSED DRILLING-TAPPING



A two-spindle horizontal opposed drilling and tapping machine has been added to a line of automatic equipment to handle second operations on screw machine parts, die castings, stampings or headed parts.

Capacity includes .020" to 3/8" drilling and up to 3/8" tapping in mild steel. Operated on shop air pressure of 80 to 100 lbs. Spindle stroke up to 2½" possible. Speed ranges available from 500 to 10,000 rpm. Designed for magazine or hopper feeding. Each automatic drilling unit has full range of controls and synchronizes for either simultaneous or alternate spindle movement up to 500 cycles per minute. Depth control of .0005" obtainable. Drilling units adjust on dovetail slides to a minimum center distance of 3" and maximum of 23".

Universal-Automatic Corp., 9545 Ainslee St., Schiller Park, Ill.

Use postpaid card. Circle No. 119

PNEUMATIC ROCKER ARM SPOT WELDER

A rocker arm spot welder has many new design features as standard equipment to reportedly speed production.

The pneumatic, double-acting cylinder head is controlled with an A.C. solenoid operated, 4-way spool type electro-valve. Electrode force is ad-

Paying too much for PARTS FEEDERS?

NOW YOU CAN GET THE BEST . . . FOR LESS

BEFORE YOU BUY BE SURE TO CHECK OUR NEW LOW PRICES . . . Send part sample and requirements of job for firm price

Standard Hoppers—PRICES*

14" diameter	185.00
16" diameter	205.00
18" diameter	225.00

Above prices include 115 volt totally enclosed electric motor. 220/440 volt motor $10.00 additional.

**Tracks extra. Send sample parts for quotation.*

Feedmatic-Detroit, Inc.

26907 W. 7 MILE RD., DETROIT 40, MICHIGAN

PHONE: KE 7-0690

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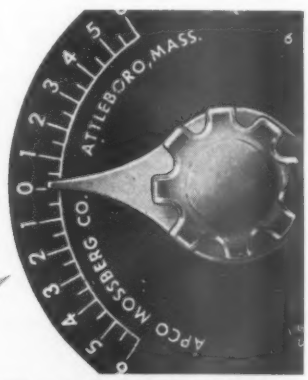
Apco drivers give you



FULL-SCALE ACCURACY

Whether it's inch grams or inch pounds, Apco Mossberg Torque Screwdrivers respond quickly and precisely throughout their entire range. *There are no springs or delicate parts to get out of kilter!* Large, white-on-black dial faces simplify readings . . . assure fast, accurate torque measurements on all types of electrical, electronic, or instrument assembly or repair jobs. Available in all sizes from inch-gram to inch-pound readings.

Write for details!

APCO MOSSBERG COMPANY

215 Lamb Street, Attleboro, Mass.

Use postpaid card. Circle No. 243

justed by a pressure regulator and gauge.

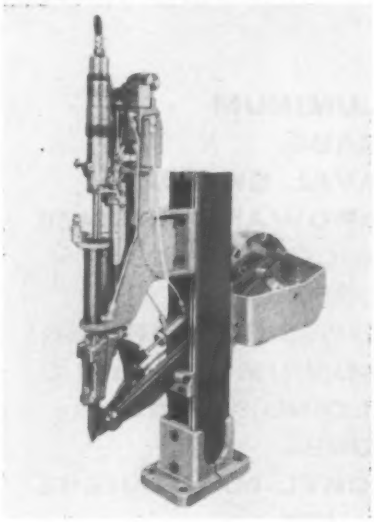
Solid copper alloy lower arm mounts rigidly in alignment to the vertical solid copper face plate. Various interchangeable horns are available for different throat depths and strokes.

Machine has low inertia, close tolerance fulcrum point. It has a modern low impedance, secondary circuit design. The plug-in control unit provides standard NEMA 3B "Squeeze, Weld, Hold and Off" time intervals.

Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill.

Use postpaid card. Circle No. 120

DRIVER'S TORQUE CLUTCH ACCURATE WITHIN 5%



A cage-controlled roller clutch is the outstanding feature of the Auto-Torque Driver, which also includes a parts positioner head, air-motor drive for the spindle and a parts feeder requiring no auxiliary motor or vibrator.

The clutch is accurate within 5% of torque setting, with closer tolerances for special applications, and causes no impact when "torquing out." It has two ranges—5 to 84 and 48 to 120 inch-ounces.

A new sensing device stops the machine if a part is missing or only partially driven. The driver handles screws and nuts from No. 4 screw to 5/16" diameter. Minimum cycle time is .6 seconds, depending on threaded distance.

Dixon Automatic Tool, Inc., 2300 23rd Ave., Rockford, Ill.

Use postpaid card. Circle No. 121

COUPLES CLAMPS TO HOSE WITH UNIFORM TENSION

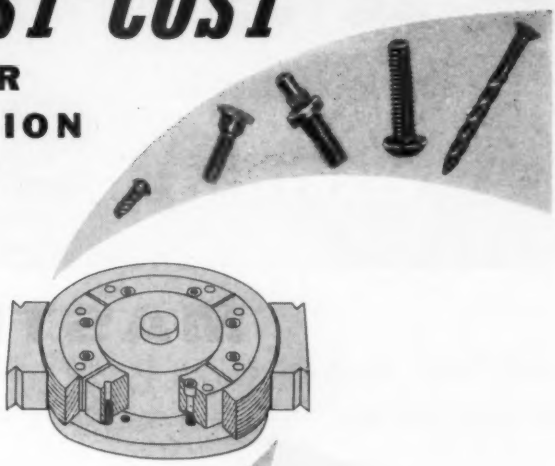
Developed for coupling industrial hose with Punch-Lok clamps, the Model TA-1 machine is said to operate at a fast rate with uniform tensioning.

The machine forms permanent, leak-proof, non-snagging connections.

Punch-Lok Co., 321 N. Justine St., Chicago 7, Ill.

Use postpaid card. Circle No. 122

LOWEST COST
FASTENER PRODUCTION



FASTEST SETUP TIME
With the

Prutton

RTH Thinwall Ring Die*

The continuous surface of the Prutton one-piece rotary die boosts thread rolling production on screws and spiral nails to 600 pcs. per minute.

Producing fasteners . . . with record-breaking Prutton Planetary Thread Rolling Machines . . . is the answer to today's need for cost reduction. Only in Prutton machines will you find the exclusive, lower cost production features of Improved Hopper design; Improved Feed Tracking; and the better, faster Adjustment Facilities of the RTH Thinwall Die Ring!

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Send complete details of your requirements for a proposal and estimate, today!

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FIRST
GREATER NUMBER
MORE VERSATILE
BEST PERFORMING
Planetary Thread Rolling Machines

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MASTERS OF METAL

Cold Headed Copper Stud

We fabricate special COLD HEADED FASTENERS from many types of metal including:

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SILVER
STEEL
ALLOY STEEL
STAINLESS STEEL

We also manufacture a regular line of standard screws

Phillips Recessed Head Screws
Clutch Recessed Head Screws
Washer Screw Assemblies (Sems)
Tapping Screws
Standard Machine Screws

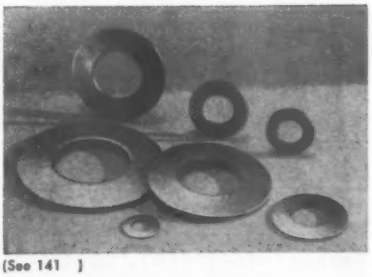
Send for your copy of "A Guide to the Profitable Use of Cold Heading."

SCOVILL | **INDUSTRIAL FASTENER SALES**
Waterville Division
Waterville 14, Connecticut

Use postpaid card. Circle No. 245

WHAT'S NEW IN FASTENERS

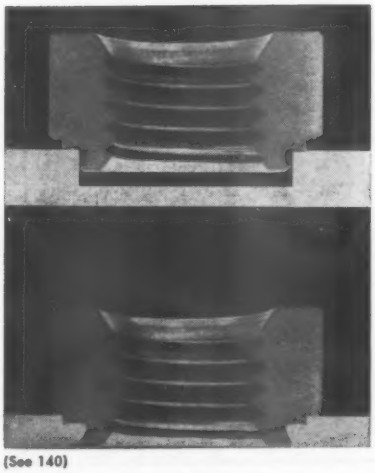
For further information on any of the fasteners listed here, use the handy postpaid card opposite page 48.



(See 141)

(See 142)

(See 144)



(See 140)

CLINCH NUT SUITABLE FOR THINNER METALS (.020")

A self-swaging clinch type nut can now be put into thinner gage sheet metal with lower installation pressures. The female-threaded fastener can be firmly anchored in sections as thin as .020" or as thick as .250" or more.

Installation pressures in steel, brass, Monel, aluminum are as much as 50% lower. The nut can also be swaged into sheet metal up to a Rockwell C-scale hardness of 25.

The Swage nut in use is strong enough to permit wrenching a 160,000 psi screw to failure without failing itself. Torque-out strength alone is sufficient to break any size screw of 125,000 psi stress level or less.

Standard Pressed Steel Co., Jenkintown, Pa.

Use postpaid card. Circle No. 140

BELLEVILLE WASHERS NOW AVAILABLE FROM STOCK

For spring problems involving high loads in limited space, belleville washers in the most used sizes are now available from stock, designed to give the best economy of space combined with the highest load and greatest deflection possible at a given stress level.

The washers are made in two different thicknesses of stock in each of seven diameters ranging from 0.375 to 1.500" O.D. and 0.190 to 0.755" I.D. Load range for single units covers 30 to 1200 lbs. Residual stresses are introduced during manufacture so the washers can be compressed to the flat position and released without loss of free cone height in spite of the high apparent stress.

Divisions of Associated Spring Corp., Bristol, Conn.

Use postpaid card. Circle No. 141

LOCK WASHER BARB GIVES HOLDING POWER

Lock washers combine all the desirable features of tooth-type washers with those of live action spring lock washers. Barbed edges provide holding power by imbedding in both nut and bearing surface.

Available are all bolt and screw size diameters from No. 000 to 6" from a variety of materials in many finishes. Prices of nine Non-Link sizes between 3/16" and ¾" reduced to level of conventional spring-type lock washers, made possible by development of automatic machine process.

Positive Lock Washer Co., 181 Miller St., Newark 5, N.J.

Use postpaid card. Circle No. 142

SILVER-CADMIUM OXIDE ELECTRICAL CONTACT RIVET

Electrical contact rivets, cold-headed directly from sintered silver-cadmium oxide wire will be known as 710 contacts. Sintered silver-cadmium oxide is considered an outstanding contact material for use in heavy duty applications where high electrical conductivity, high resistance to sticking and welding, and good resistance to arc erosion are all required.

The contacts offer uniform dispersion of cadmium oxide throughout the silver matrix, uniform electrical conductivity for all parts and batches, and uniform ductility, important for staking and double heading of contacts. The electrical conductivity of this material runs 84 to 88% I.A.C.S., 6 to 12% higher than that of the oxidized type and about 15% higher than the conductivity of the pressed and sintered type.

J. L. Thomson Mfg. Co., 122 Sawyer Rd., Waltham 54, Mass.

Use postpaid card. Circle No. 143

MINIATURE SELF-LOCATING TWO-POINT NUT

A departure in wrenching procedures is incorporated in a two-point miniature self-locking nut.

The H50 is a full-strength miniature adaptation of the standard hex nut in the smaller thread sizes: No. 4-40, No. 6-32, and No. 8-32, and conforms to applicable Government performance specifications for self-locking nuts.

Elimination of conventional hex wrenching surfaces permits wrenching on the threaded nut element itself, which is provided with two integral

wrenching points. This permits installation with standard spintype or socket wrenches 3 to 4 sizes smaller than needed for standard hex nuts.

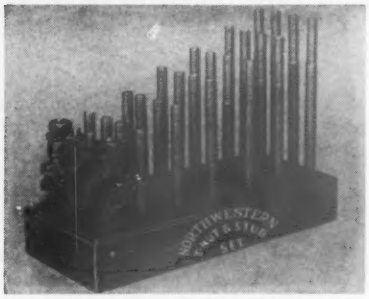
The bearing flange of the nut eliminates tilting in the wrench socket, and makes for more rapid engagement of the mating bolt. It also keeps the wrench from touching the work surface, making it impossible to scratch or otherwise damage it.

The H50 is made of heat-treated carbon steel for temperature ranges to 550 F.

Kaynar Mfg. Co., Inc., Box 2001, Terminal Annex, Los Angeles 54, Calif.

Use postpaid card. Circle No. 145

ADD T-NUT, STUD SETS TO HOLD DOWN TOOL LINE



T-Nut and Stud Sets have been added to a line of hold down tools. The sets are available for T-Slots in ⅜" through 1 1/16" widths. Each set includes four each of 3", 4", 5", 6", 7", 8" studs, four flanged nuts, four coupling nuts, six T-Nuts and a holder.

Northwestern Tools, Inc., 117 Hollier Ave., Dayton 3, Ohio.

Use postpaid card. Circle No. 146

SELF-LOCKING INSERT USES STANDARD TAP, TOOLS

E-Z-Lok self-locking threaded inserts are unusual because they require only standard coarse thread taps and bolt or screw driver for installation.

The reusable insert's resistance to vibration is due to the resilient nylon pellet (Nylok) which sets up a counter-force to create strong metal-to-metal engagement of threads opposite the pellet. It also resists heat, cold, moisture, solvents and aging.

Designed for using in aluminum, magnesium, plastic or cast iron tooling operations, the inserts are recommended where threads are re-used and subject to wear, or with aluminum patters and molds for fiberglas lay-up, where tool disassembly is required.

Tool Components, Inc., 12923 Budlong Ave., Gardena, Calif.

Use postpaid card. Circle No. 147

SPRING PINS NOW COME IN 700-ITEM KIT

Rollpins are now available in the No. 300 kit form, a compartmented plastic box containing over 700 carbon steel spring pins in a variety of diameters. The individual pieces range from 3/16" to 3¼" in length.

A slotted chamfered, tubular spring pin which has been heat treated for maximum strength, the Rollpin serves the function of taper, straight, hinge, cotter or stop pins, set screws, rivets, dowels. The pin diameter is slightly larger than the hole into which it is inserted, causing it to exert constant pressure against the hole wall, preventing loosening even under severe vibration conditions.

Elastic Stop Nut Corp., 2330 Vauxhall Rd., Union, N. J.

Use postpaid card. Circle No. 148

A NEW FASTENER... A NEW TYPE OF FASTENER

DIE CAST ROUND-HEAD THUMB NUTS & SCREWS with GRC's exclusive WIDE GRIP feature

Head Diameters ⅛" thru 1⅛" Thread Sizes No. 4 thru 7/16"

Other GRC Fasteners

Die Cast Zinc Alloy Wing Nuts. Cap Nuts. Wing Screws. Rivets

Molded Nylon Screws. Washers. Screw Insulators

Mass produced in rust-proof zinc alloy at low cost, with eye appeal to help sell your product . . . generous width taps have deep fluted edges for firm, comfortable grip. Closed or open end nuts. 1-pc. die cast or 2-pc. assembled screws with and without shoulders.

Write NOW for prices and GRC's New Fastener Catalog.

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World's Foremost Producer of Small Die Castings

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PRECISION and QUALITY

. . in miniature

MORRIS Miniature SCREWS & NUTS

The diamond ring and miniature screws above are products of the most exacting craftsmanship.

We, as specialists in miniature work, offer screws, nuts, and parts of jewel-like excellence from stock and to special order. Taps and dies complete our line of precision miniature threads.

Immediate personal attention is given to all inquiries and orders, small or large.

Write for Catalog 98

J. I. MORRIS CO.

Southbridge, Mass.

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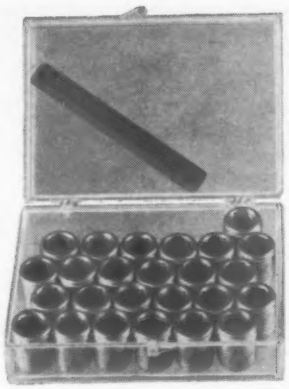
SET SCREW INSERT RESTORES TAPPED HOLES



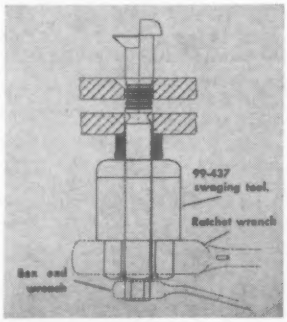
A set screw insert designed to restore tapped holes is being marketed in U-Tap Inserto Kits. To correct the problem of stripped threads, an operator would simply drill out and retap the damaged hole, installing the Inserto with a special Hex-Bar tool.

A unique stepped external thread provides gradual installation torque increase (within controlled limits), locking the insert against all normal loosening effects. Internal thread sizes are available from No. 4 through ⅜", both coarse and fine series.

Rosan, Inc., 2901 West Coast Hwy., Newport Beach, Calif.

Use postpaid card. Circle No. 149

INSTALL AIRCRAFT BOLTS WITH BENCH TOOLS



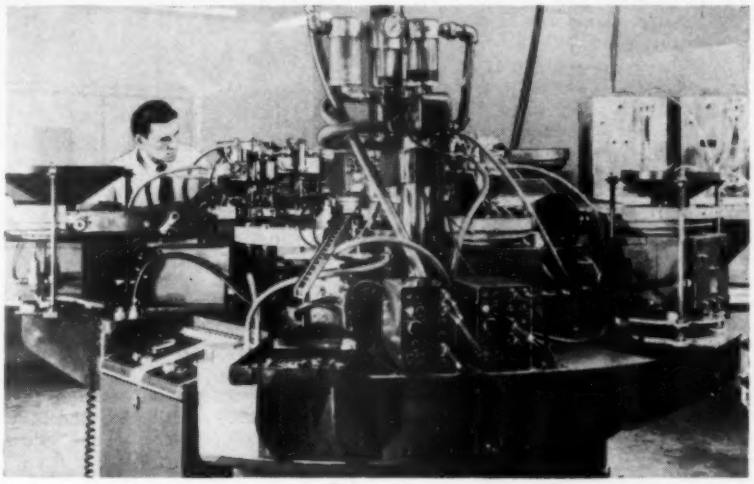
Aircraft Huckbolt fasteners can now be installed with standard bench tools. Wrench installation permits use of the fastener in hard-to-reach applications. Fasteners installed with standard hand wrenches will uniformly match their power-tool-installed counterparts in appearance and strength.

The wrench-installed configuration (above) was developed to meet the specific requirements of aircraft applications where assembly interference problems preclude the use of Huck installation tools. It provides the same pull-together, tensile preload, uniformity of installation and permanence obtained with the power-tool-installed AL and SAL fasteners. Wrench installation also duplicates AL and SAL fatigue, shear and tension strengths.

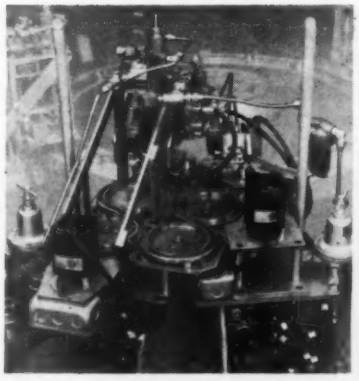
Fabricated of alloy steel the wrench-

ASSEMBLING SMALL PARTS YOUR PROBLEM?

Whether your needs call for a complex, indexing multistation assembly machine, a simple two- or three-station assembler or just an individual tool or feeder for an existing machine or line, Sperry Multra Engineers have the background of experience to help you solve your problem.



A typical 16-station Multra unit provides a complete self-contained production line for automatic assembly of small parts. Its exceptional versatility and adaptability make it ideal for operations such as inserting, crimping, screw-driving, welding, riveting, staking and many others used in the assembly of a wide variety of electrical, electronic and mechanical products.



SINGLE STATIONS FOR ESTABLISHED PRODUCTION LINES

Design of individual tool stations custom-built into established lines are another feature of the outstanding engineering service offered by Multra.

MULTRA FEEDERS CUSTOM-DESIGNED FOR ANY OPERATION

Feeders are vitally important in the efficient operation of any automatic assembly system. Feeding problems have long been a specialized study of Multra engineers.

Whether you need a complex system for a multistation line or a straight forward system for a single stage, Multra can design and engineer the complete job ready to operate in full production. If you have *any* problems involving automatic assembly, call or write us today.

Multra Automatic Assembly Machines

SPERRY PRODUCTS, INC.

Danbury, Conn.

Use postpaid card. Circle No. 248

installed fastener is available with either protruding of flush head designs in either tension or shear aircraft type. Nominal pin diameters for the AL tension type are 5/32", 3/16", 1/4", 5/16" and 3/8". SAL pins are available in 3/16", 1/4", 5/16" and 3/8" nominal diameters. Standard oversize diameters are also available for wrench installation. A wide variety of grip ranges, which determine material thicknesses a given fastener can join, is provided for each diameter. Standard collars are used with the wrench-installed pin design.

Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

Use postpaid card. Circle No. 150

STOCK THREE NEW SIZES IN BLIND FASTENER LINE

Three new sizes have been added to the Well-Nut line in answer to the demand for wider, thicker flanges. This antivibration, air and water-tight fastener is a tough, neoprene bushing of special composition. In one end is bonded a threaded hex brass nut.

Only a screw driver is required for installation. As torque is applied to a screw the brass nut draws the neoprene back against the material—giving a firm, strong hold.

Specifications of the new sizes:

	G-1032	A-1024	D-1420
Flange thick ..	.187"	.125"	.187"
Flange dia.	.750"	.562"	.750"
Plug length ...	.620"	.437"	.642"
Plug dia.	.375"	.375"	.500"
Threads	10/32	10/24	¼/20

Rockwell Products Corp., 146 Central Ave., Newark 3, N.J.

Use postpaid card. Circle No. 151

SILVER BRAZING WASHERS FLAT WIRE EDGEWOUND

Non-tangling coil form washers are edgewound from flat wire and are said to reduce silver brazing costs. Produced without dies from standard wire stock, the washers eliminate scrap losses.

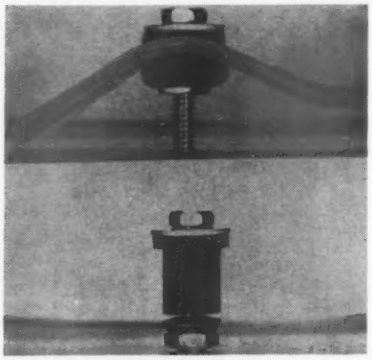
The washers are suitable for use with induction, gas-air, furnace heating methods and accurate metering of alloy and leak tightness are assured. Diameters up to 4" I.D. are held to close tolerances in thicknesses from .010" upward. Available in Easy Flo and Silfos as well as copper, bronze and alloys.

Flat wire alloy is wound on edge and then cut partially through. The coil of washers is shipped intact and when used, each washer is snapped from the coil and preplaced on work as needed.

Lucas-Milhaupt Engineering Co., Cudahy, Wis.

Use postpaid card. Circle No. 152

GROMMET TYPE FASTENER INSTALLED ON WEATHERSIDE



Lap-Lox consists of an assembled hex bolt, with two sealing washers, a rubber sleeve and a nut. The grommet type fastener is used for fastening the side laps of translucent plastic or light gauge metal and is installed from the weatherside, eliminating the need for underneath scaffolding.

The washer placed under the fastener head seals against leaks, the underneath metalcore washer has the neoprene composition bonded to both faces of the metal washer and serves as a frictional lock when the fastener is being tightened.

Tightened with an ordinary ratchet wrench, the rubber sleeve compresses under tension to form a positive grip.

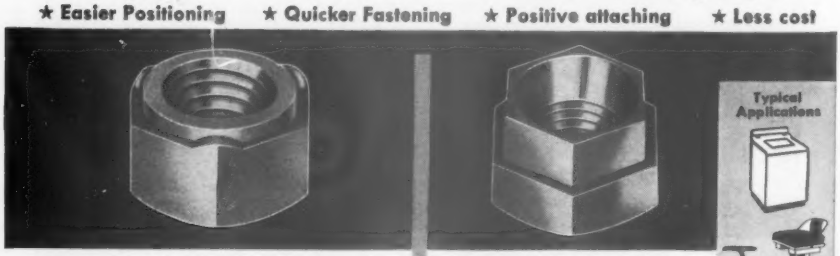
Fabricated Products Co., Inc., West Newton, Pa.

Use postpaid card. Circle No. 153

Use These GRIPCO NUTS

FOR "FIXED" and "BLIND" fastening to get

★ Easier Positioning ★ Quicker Fastening ★ Positive attaching ★ Less cost



GRIPCO PILOT-PROJECTION WELD NUT

The centering pilot provides quick, easy positioning of nut in pre-punched hole for instant resistance welding. No jigs, no fumbling, no waste of time. No fouling of threads. In two pilot and projection heights with or without the Gripco Locking feature. Sizes No. 6 thru ⅝".

GRIPCO COUNTERSUNK WELD NUT

Countersunk feature eliminates time-wasting re-tapping of nut after welding. The 3 weld projections on both type nuts provide a firm non-rocking electrical connection.

GRIPCO CLINCH NUTS

With or without Gripco locking feature, for positive attaching of a threaded medium to thin metals. Can be automatically fed and clinched or staked with hydraulic or air equipment.

Write for this new FREE catalog today. Ask for samples.

ALL GRIPCO FASTENERS AVAILABLE FOR IMMEDIATE DELIVERY

GRIP NUT COMPANY

113 Maple Ave. • South Whitley, Ind.

Ad No. 122

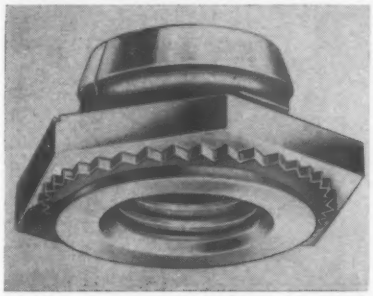
Use postpaid card. Circle No. 249

ALIVE TODAY!

Arch Lightbody is one of 800,000 Americans cured of cancer because they went to their doctors in time. They learned that many cancers are curable if detected early and treated promptly. That's why an annual health checkup is your best cancer insurance.

American Cancer Society

ALL-METAL, SELF-LOCKING, SELF-CLINCHING NUT



A new all-metal, self-locking, self-clinching nut for sheet metal fastening combines two essential functions in one light-weight low-cost unit.

This design employs a clinching ring which, when squeezing pressure is applied, causes the sheet metal to flow around a back-tapered shank, securely locking the fastener in the sheet with a flush fit on the reverse side. High torque, many times greater than the screw torque, and high pull out resistance are provided.

The self-locking feature of inherent flexing action guards against relaxation and loosening of the fastener in severe service and permitting the nut to be used repeatedly without diminishing its self-locking effectiveness.

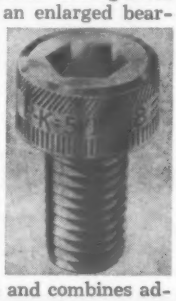
Made in both steel (with various finishes) and stainless steel, these all-metal, self-locking, self-clinching nuts are offered in a range of sizes for use in aluminum, magnesium, brass, copper, and cold rolled steel sheets. Performance: MIL-N-25027.

Penn Engr. and Mfg. Corp., Doylestown, Pa.

Use postpaid card. Circle No. 155

SOCKET HEAD CAP SCREW ELIMINATES INDENTATION

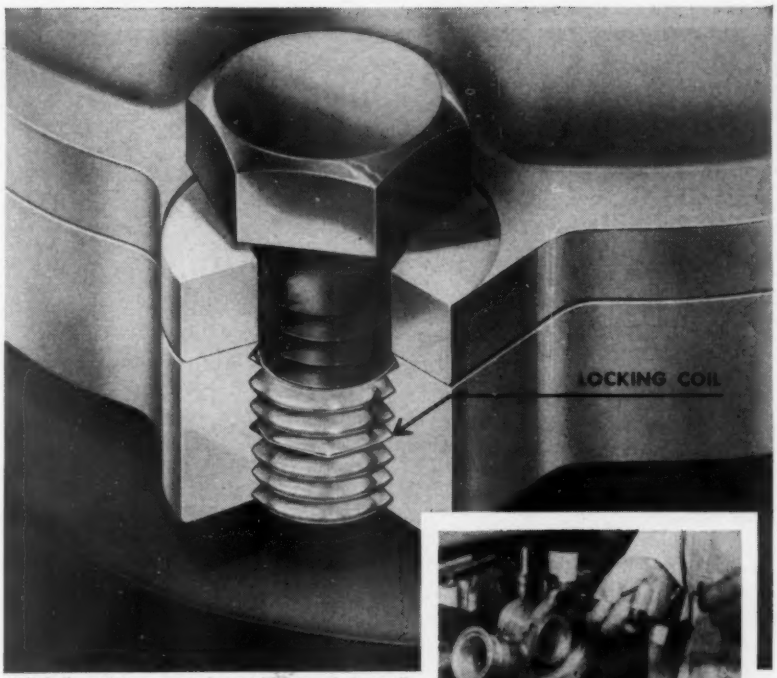
A socket head cap screw having more wrenching area and an enlarged bearing surface is designed to meet demands for greater strength and higher load-carrying capacity. It has been developed in conjunction with a project sponsored by the Socket Screw Manufacturer's Technical Committee and combines advanced design in the thread and body-head fillet areas with a carefully calculated increase in the bearing area under the head.



Pre-Lode socket screws eliminate indentation of bolted materials while utilizing and maintaining full holding power under highest tensile load. The fasteners with increased bearing area under the head, distribute the load uniformly, prevent sapping of the tightening force used in preloading, function in holes having a greater body clearance and having a longer working life.

Parker-Kalon Div., Clifton, N.J.

Use postpaid card. Circle No. 154



Heli-Coil stainless steel Screw-LOCK Insert is easily wound into tapped hole in aluminum housing. Spring tension of the locking coil retains the screw securely, meets military specifications for locking torque and vibration.

How Carrier Corporation

Saves 40% in weight • 30% in assembly time

...with HELI-COIL® SCREW-LOCK* INSERTS

...and assures maximum performance of threaded connections in the refrigeration system for air conditioning the giant Douglas DC-8 jetliner.

In assembling aluminum alloy compressor castings, Carrier engineers needed reliable threaded connections that could resist the heat and vibration encountered at 600 mph. They selected *Heli-Coil's* one-piece, *internal locking* Screw-LOCK Insert.

The results: design simplified, boss areas minimized, weight reduced as much as 40%, lock nuts and lock wiring eliminated. Now one man assembles the entire unit in 30% less time than before . . . and danger of thread failure has ended!

It's a typical example of why manufacturers in every field are turning to precision formed, stainless steel *Heli-Coil* Screw-LOCK Inserts to meet torque and vibration specs . . . to protect threads against wear, stripping, galling and corrosion . . . to save costs, space and weight. *Pat. Applied For

HELI-COIL CORPORATION
DANBURY, CONNECTICUT

1552

HELI-COIL CORPORATION, 3112 Shelter Rock Lane, Danbury, Connecticut
I'd like more information on *Heli-Coil* Screw-LOCK Inserts

NAME_____ TITLE_____
FIRM_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

IN CANADA: W. R. WATKINS CO., Ltd., 41 Kipling Ave., S., Toronto 18, Ont.

Use postpaid card. Circle No. 252

THOMSON TAKES EXTRA PAINS TO PREVENT FASTENING HEADACHES!
Statistical quality control procedures plus 100% inspection give double assurance of close adherence to specified rivet dimensions and positive protection against interrupted production.

YOU GET PRECISION FASTENING AT MASS PRODUCTION COSTS...

. . . when Thomson becomes your fastening partner.

In the Thomson line of more than 8,000 rivet designs, you'll find the semi-tubular, deep-drilled, bifurcated (split), shouldered or compression rivet that will give you the best strength-cost ratio in the fastening field. Produced to the industry's highest quality standards at production rates exceeding 20,000,000 rivets a day, these low-cost fasteners merit serious consideration in your product-improvement and cost-reduction programs.

Our leadership in solving fastening problems with quality rivets and precision rivet-setting machines since 1885 is at your service. What is your problem?

JTL

JUDSON L.

THOMSON

122 SAWYER ROAD

MFG. CO., WALTHAM 54, MASS.

Use postpaid card. Circle No. 253

USEFUL LITERATURE

To receive your copy of any literature reviewed here, use the postpaid card opposite page 48.

POWER TOOLS

Pocket-sized multi-folded brochure presents heavy-duty electric screw drivers and nut runners. Each tool is equipped with either a positive drive or adjustable torque release clutch. Specifications, typical applications, illustrations and various charts for screw size and pilot hole clearances, bits and finder sizes are listed. Machines handle wide range of fasteners. Milwaukee Electric Tool Corp., 5316 W. State St., Milwaukee 8, Wis.

Use postpaid card. Circle No. 1

PRECISION FASTENERS

Standard and special fasteners are featured in 30th anniversary products publication. The four-page bulletin outlines and illustrates the broad types of fasteners available and lists special features, including cold heading, rolled threads, close tolerance ground shanks, complete drilling, plating and coating of all types, etc. Chandler Products Corp., 1491 Chardon Rd., Cleveland 17, Ohio.

Use postpaid card. Circle No. 2

POWER INSERTING TOOL

Action of the power tool for installing screw thread inserts is told in attractive two-color, six-page Bulletin 702C. Adaptable to several size inserts within model range, each tool can also be set-up as a portable electric type tool, air type tool, with adapter in drill press, with a universal tool holder. Instructions for servicing, operating, dimensional data, charts and illustration complete. Heli-Coil Corp., Danbury, Conn.

Use postpaid card. Circle No. 3

CONVEYORS

Packaged power conveyor units of both stationary and portable design for either horizontal or inclined conveying are illustrated and described with photos, cross sections and dimension charts in a two-color catalog. Accessory items are also treated and another section covers gravity roller and wheel conveyors. Harry J. Ferguson Co., Jenkintown, Pa.

Use postpaid card. Circle No. 4

AIRCRAFT BLIND RIVETS

Aircraft blind expansion rivets—their construction, use, specifications—and tooling are described in 10-page catalog. One-piece fastener contains chemical charge located in a cavity in the rivet shank which expans when exposed to heat, locking rivet in place. Open or sealed (for honeycomb-type structure) types available. Proper application and tables for the high-temperature and other series of rivets well prepared. Riveting irons and a special precision riveting machine shown. Dupont de Nemours & Co., Explosives Dept., Wilmington 98, Del.

Use postpaid card. Circle No. 5

SOLDERING FLUXES

A line of specialized soldering fluxes presented in four-page circular. Self-cleaning, non-acid fluxes in paste, liquid and stick form for all types of metals, including stainless steel and chrome, aluminum, silver solder and as an electro-flux for signal and communication work which must be kept free of stray currents. Packaging and uses described. The Lake Chemical Co., 3052 W. Carroll Ave., Chicago 12, Ill.

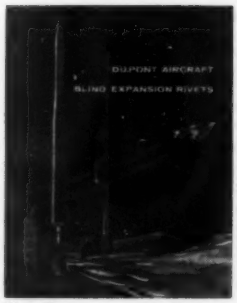
Use postpaid card. Circle No. 6

NEW WELDING SYMBOLS

The first major change in welding symbols in recent years is announced by the American Welding Society in a new standard selling for $3. Among the new symbols are: symbols for spot and seam welds made by arc welding; symbols for welds used in aircraft, guided missile and automotive work; and symbols for the types of welds used in structural steel fabrication, reinforced concrete work and the like. A table is included which provides a new sys-

(See 1)

(See 2)



(See 5)

tem for designating welding and cutting processes by letters. The system covers the 37 commercially-used welding processes and also provides a means for indicating automatic, machine, manual and semi-automatic welding. The Chart of Welding Symbols has also been redesigned to incorporate the new developments.

Use postpaid card. Circle No. 7

METAL FINISHING FACTS

"Metal Finishing Standards" is a valuable 10-page data sheet divided into seven parts: metal finishing facts, plating specifications, surface treatment specifications, corrosion resistance table, metal finishing test methods, stainless steel and specification tables. The advantages, limitations, application, specification, appearance of all types of platings are completely described. Allen Mfg. Co., Hartford 2 Conn.

Use postpaid card. Circle No. 8

INSULATION ADHESIVES

A four-page, two-color, illustrated catalog describes adhesives for bonding insulation and insulating sealers for the heating, ventilating, building, automotive, truck, trailer and railroad industries. Four typical insulation adhesive and sealer applications are described in the catalog. The properties, uses, application methods and coverage of insulation adhesives and sealers are also listed in chart form. Adhesives, Coatings and Sealers Div., Minnesota Mining and Manufacturing Co., 423 Piquette Ave., Detroit 2, Mich.

Use postpaid card. Circle No. 9

FASTENER LINE

Two-color flyer illustrates fastener line, specializing in stainless steel nuts, bolts and screws. Other materials available. Six types stocked in all sizes, quantities: nuts (¼" to 2"), machine screws (No. 0 to ⅜"), cap screws (up through 1¼"), machine screw nuts (No. 0 to ⅜"), AN nuts. Specials by specification. Westfield Metal Products Co., Inc., 1000 Lower Union St., Westfield, Mass.

Use postpaid card. Circle No. 10

HIGH TEMP FASTENERS

Details on Hot-Tuf socket head screw in 12-page product and price list of standard hex socket screw line. Special fastener is designed for heavy-duty, high temperature holding applications. Standards in both plain and knurled heads, heat treated alloy steel, class 3A threads. Also hex socket pipe plugs, set screws and keys. Kerr-Lakeside Industries, Inc., 21850 St. Clair Ave., Cleveland 17, Ohio.

Use postpaid card. Circle No. 11

MOLECULAR BONDING

Alumibonding—the process of joining aluminum and ferrous metals by molecular bonding—is explained in an informative eight-page bulletin. It is basically a casting process with the bonding layer an inter-metallic compound of the two joined metals. Photographs, graphs and charts suppliment text material on applications and features of the process. Arthur Tickle Engineering Works, 21 Delevan St., Brooklyn 31, N.Y.

Use postpaid card. Circle No. 12

SCREW MACHINE PRODUCTS

A 20-page brochure illustrates typical machine screw product work which this facility does and the equipment available for both automatic and secondary operations. Large pictures and easy-to-read type make this booklet handy for quick review. Hartford Machine Screw Co., Hartford 2, Conn.

Use postpaid card. Circle No. 13

CHUCKS

Power tool chucks and other products are described in 14-page two-color catalog with krome-cote cover. Details of new geared keyless chuck (Precisionist) given along with illustrations and specifications of entire line: geared key, heavy duty ball bearing, industrial duty keyless, impact wrench, tap chuck. Portable drill attachments, repair parts, arbors and adapters included. Supreme Products Corp., 2222 S. Calumet Ave., Chicago 16, Ill.

Use postpaid card. Circle No. 14

ULTRASONIC WELDING

The scope of ultrasonic welding, its benefits and capabilities are outlined in four-page Bulletin SW-87. Description of machine which welds without fusion, photomicrographs of four ultrasonic welds and a chart showing the representative strength of ultrasonic spot welds in various metals prove helpful. Sonobond Corp., West Chester, Pa.

Use postpaid card. Circle No. 15

AIRCRAFT FASTENERS

A 16-page illustrated two-color catalog (Form 8-411) describes the complete line of AL aircraft Huckbolt fasteners and ALS aircraft Huckbolt stumps. The catalog explains the nature of the two fastener types and their driving cycles. Included is much general technical information as material, heat treatment and finish specifications, strength properties, rate of installation and shop practice notes. Illustrations, descriptions, dimensions for the various pneumatic, hydraulic and manual driving tools available for installing AL and ALS fasteners are provided. Recommended procedures for inspection of installed Huckbolt fasteners and Huckbolt stumps is given. Typical installations are illustrated. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

Use postpaid card. Circle No. 16

WASHERS AND STAMPINGS

Catalog No. 40 contains 20 pages of data on complete line of washers and stampings, alphabetically indexed for quick finding. Illustrations and specifications for each type listed. Tear-out fraction and decimal equivalent chart included. Wrought Washer Mfg. Co., 2100 S. Bay St., Milwaukee, Wis.

Use postpaid card. Circle No. 17

MINIATURE SCREWS

Loose-leaf pamphlet gives data on Microsize screws—socket head cap and socket set—made of heat-treated alloy steel in sizes from No. 0 to No. 3. Illustrations, price list, specifications. Unbrako Socket Screw Div., Standard Press Steel Co., Jenkintown, Pa.

Use postpaid card. Circle No. 18

TORQUE WRENCH

Guaranteed exact tension is highlight of four-page loose-leaflet on torque wrench use. A micrometer-style indicator is pre-set for desired tension and operator pulls on wrench handle until "breaking-point." Two models available. Users listed. Reasor Mfg. Co., St. Charles, Ill.

Use postpaid card. Circle No. 19

BLIND RIVETING

Blind riveting is the topic of 18-page engineering and data manual of file cabinet size. Coded specification charts cover all types of Chobert blind rivets, including sheets on mandrels and rivet guns. Aviation Developments Inc., 210 S. Victory Blvd., Burbank, Calif.

Use postpaid card. Circle No. 20

THREAD ROLLER

Four-page data sheet reviews Shuster thread roller, giving specifications of latest model and picturing entire line. Also wire straightening and cutting machines of all sizes. Mettler Machine Tool, Inc., 155 W. Adeline St., New Haven, Conn.

Use postpaid card. Circle No. 21

ELECTRODE HOLDERS

Welding electrode holders which eliminate the need for whips and whip ends portrayed in two-page flyer. Straight and pug nose models illustrated and described. Suitable for mechanical or solder attach. Cam-lok, Box 98, Cincinnati 36 Ohio.

Use postpaid card. Circle No. 22

MACHINE PINS

American Standard B5.20-1958 is the first revision since 1954 machine pins—covering the dowel, taper, straight, clevis, grooved and cotter varieties. The 14-page handbook consists of diagram specifications, tables of dimensions and an appendix of drilling specifications for taper pins. $1.50. American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N.Y.

Use postpaid card. Circle No. 23

SOCKET SCREW SELECTOR

Handy 9" x 6" socket screw selector can be kept in desk or hung on wall. By setting push-pull insert at nominal screw diameter, pertinent facts register in easy-to-read type about hexagon socket set screws, socket head shoulder screws, hexagon socket pipe plugs, socket head flat head or button head cap screws. Holo-Krome Screw Corp., Hartford 10, Conn.

Use postpaid card. Circle No. 24

EXPANSION INSERT

The Dodge expansion insert, designed to be placed by hand or machine-fed into molded or drilled holes after molding, can effect savings as much as 20% by eliminating open press time, according to four-page bulletin. Step-by-step application, stock sizes and a list of insert users comprise the publication. Phelps Mfg. Co., Colonial Green Bldg., Westport, Conn.

Use postpaid card. Circle No. 25

SOCKET SCREW PRODUCTS

Design advantages of using socket screws are charted in eight-page engineering sheet suitable for loose-leaf folder. Dimension standards for socket head cap screws 1" diameter and smaller, flat head cap screws, button head cap screws, hex socket set screws and pipe and shoulder screws are listed. Materials and methods also given. Brighton Screw and Mfg. Co., Reading Rd., Cincinnati 2, Ohio.

Use postpaid card. Circle No. 26

SPRING LOCK WASHERS

"A Guide to Better Fastening" is a must for all using spring lock washers. This 36-page technical report first describes and illustrates the functions of a washer and principles of selection. The remainder consists of 30 pages of test results plotted on two-color graphs: a series of curves obtained for helical coiled spring lock washers having been compressed twice with a load sufficient to flatten the helix in order to remove an initial permanent set that may be encountered. The reactive pressure data, obtained and plotted at various indicated releases, is from the third compression of the washer. The release curves show the washer in action as dimensional changes occur between bearing surfaces from wear, corrosion, thread creep, gasket set, etc. Eaton Mfg. Co., Reliance Div., Massillon, Ohio.

Use postpaid card. Circle No. 27

NUTS, BOLTS, SCREWS

Fasteners and holding devices for joining and assembling steel components, sheet metal parts, wood sections, laminated units, plastic elements described in four-page circular. Complete line of standard and special screws, bolts, nuts, including Phillips recessed head fasteners. Sems—lock washers as part of unit assembly—are presented. Also machine screw nuts. Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.

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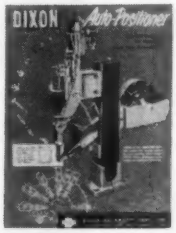

ASSEMBLY MACHINE

Design engineers and production men will find four-page folder gives complete information on Auto-Positioner, which places and assembles small piece parts, Nomenclature, description tooling and application presented. Four models available. Newly developed parts feeder also illustrated in action. Dixon Automatic Tool, Inc., 2300 23rd Ave., Rockford, Ill.

Use postpaid card. Circle No. 29

QUICK ASSEMBLY RIVETS

Rivets designed for quick assembly of sheet metal parts or mouldings and inserting equipment are featured in 10-page brochure. The "Y" shaped clip is clinched with pliers or air-operated gun, drawing the parts together to form a vibration free joint. Diagrams, specifications and illustrations. Robin Products Co., 27027 Grosebeck Hwy., Warren, Mich.

Use postpaid card. Circle No. 30

USING SPECIAL FASTENERS

"The Problem of Special Fastener Applications" is written to help meet these problems without added costs. The six-page reprint deals with bolting in blind applications, adjustable fasteners, hammer riveting, quick-opening fasteners. Step-by-step diagrams suggest solutions. South Chester Corp., Lester, Pa.

Use postpaid card. Circle No. 31

LOCK NUT

Action of Elastic Stop nut, which grips bolt threads with locking and sealing fit, described in two-color bulletin. The many applications possible are illustrated, complete with specifications and properties. Nut acts against vibration, stress reversals, and eliminates axial play. Elastic Stop Nut Corp., 2330 Vauxhall Rd., Union, N.J.

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DIE CAST CAP NUTS

Standard specifications for three types of die cast zinc alloy cap nuts—regular closed end cap units, regular open end cap nuts, high closed end nuts—are available on 8½ x 11 sheets. Complete details on blank sizes, thread sizes, principal dimensions and approximate shipping weights. Gries Reproducer Corp., 400 Beechwood Ave., New Rochelle, N.Y.

Use postpaid card. Circle No. 33

FASTENERS

Indexed catalog contains 110 pages on varied fastener line: sheet metal, drive and wood screws, bolts, nuts, pins, washers. For purchasing—illustrated handbook showing prices, container quantities, standard sizes. For engineering—dimensional standards and commercial tolerances. Universal Screw Company, 2401 Brummel Place, Evanston, Illinois.

Use postpaid card. Circle No. 34

SET SCREWS

A 28-page catalog on socket screw products includes the recently introduced socket shoulder screws, flat heads, button heads, dowel pins. Also shown is the expanded line of "perfect-hole" cold forged socket head cap screws. A feature of catalog No. 23 is the inclusion of the Setko self-locking set screw selector chart. Over 1001 combinations of metals, locking actions, points and suggested applications. Set Screw & Mfg. Co., Bartlett, Ill.

Use postpaid card. Circle No. 35

BRAZING STAINLESS STEEL

Special facilities and skills required to braze and process stainless steel and alloys are artfully displayed in two-color brochure. Samples of work, plant scenes and complete description of equipment available concisely presented. Furnaces capable of receiving work up to 72" high. Can handle titanium, aluminum, low carbon coil steel. Stainless Processing Div., Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich.

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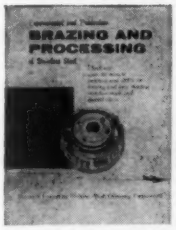


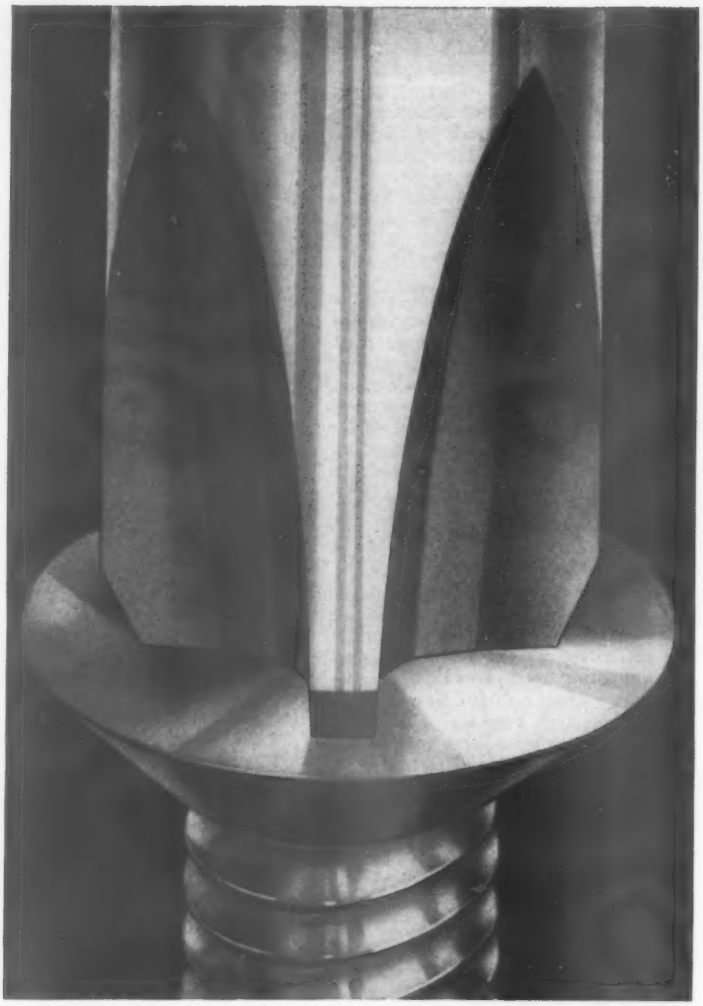
SCREW MACHINE WORK

Samples of screw machine products highlight four-page flyer which illustrates work, gives material, run, dimensions, minimum tolerances and operation used for each of eight items. Effective presentation of company's capacities—smallest run: 285, largest run: 285,000; tolerances plus .0000, minus .0002 with 8 micro-inch finish on small Hastelloy C pin, 12,000 run. Allmetal Screw Products Co., Inc., 821 Stewart Ave., Garden City, N.Y.

Use postpaid card. Circle No. 37

To get "We-care-about-you" Service,

AMERICAN is the name!



Whoever you are, *wherever* you are, American is set to service your fastener needs with a schedule to meet your requirements.

It is this interest in *your* needs that gives American an extra plus in the four main factors that govern your true fastener costs.

American gives you more of all four

More in quality . . . with 30-minute exactness checks plus dimensional and physical inspections.

More in research . . . with important, new cost savings for you in your assembly and tooling, by the company that developed the original Phillips fastener.

More in service . . . with inventories maintained in key locations and facilities to meet your most demanding production schedule.

You may find *local* price differences occasionally, but nowhere will you get more of all four than at American.

Make your own comparison — send your inquiry for price and delivery of stock fasteners . . . or send your specifications for special units. Be sure to ask for American's Stock List.

AMERICAN SCREW COMPANY
WILLIMANTIC, CONN.
CHICAGO, ILL. • DETROIT, MICH.

American!

SCREWSTICK, another American development, enables power driving to replace individual handling of hard-to-manage small screws with a cost saving of 4 to 1.

Wood Screws • Machine Screws • Nuts • Tapping Screws • Thread-Cutting Screws and Sems • Specials

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INDUSTRY MAKES NEWS

J. C. Warford (left) and D. P. Reynolds examine the first extruded distribution transformer housing.

AUTOMATIC WELDING AIDS REYNOLDS CO.

Development of an aluminum distribution transformer housing easily manufactured from extrusions, coupled with new welding techniques, could mean a potential 25 million pound-a-year market for Reynolds Metals Co.

Weighing one-third of its steel equivalent, the tank's extruded sections can be automatically welded at great speeds. Formerly, the tank itself had to be welded, then each of the heat-dissipating fins laboriously welded to the housing. The sectors are applicable to 25 kva and larger transformer sizes. The extrusions incorporate lifting lugs, hanger attachments and core and coil supports.

The tank's lighter weight makes for easier, safer and more economical installation.

New fastener washing and de-chipping machine in Allen's new plant removes contaminants before heat treatment and packaging.

NEW ALLEN PLANT—EFFICIENT, SPACIOUS!

After 50 years of manufacturing hex-socket screws in downtown Hartford, Conn., Allen Mfg. Co. has settled in a new plant, five miles northwest in Bloomfield.

Designed for efficiency and expansibility, according to president Malvern J. Mather, the 250,000 sq. ft. factory area has been laid out in a direct-flow production line following the perimeter of the building: raw materials, processing, inspection, packing, shipping.

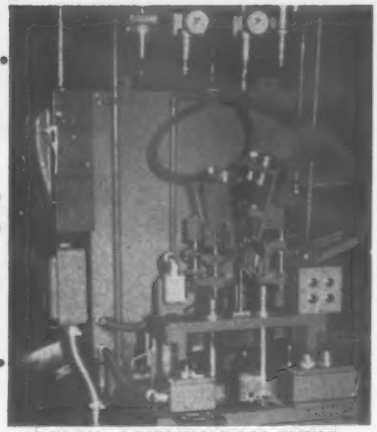
A two-story 20,000 sq. ft. office building is connected to the factory by a long glass-enclosed corridor that serves as the entrance to the plant. The main building also includes a 10,000 sq. ft. pilot plant and 28,000 sq. ft. basement.

Allen has expanded its technical facilities considerably. New equipment and personnel have been added to the quality control and engineering departments and metallurgical laboratory. Being installed is a Tinius Olsen torsion machine of 120,000 inch-lbs. capacity, for measurement of torsional shear. A special room is devoted to metallograph studies.

For raw materials storage, an unusual conveyor system and "Christmas-tree" racks handle 4½

continued

special assembling equipment



RELAY ASSEMBLY MACHINE
. . . GARVIN BROTHERS COMBINES THEM ALL

and is prepared to design and build machines for your plant to do any combination of or all of these operations:

HYDRAULIC - PNEUMATIC - ELECTRIC - MULTIPLE NUT RUNNING
MULTIPLE GRINDING - MULTIPLE DRILLING - ACCURATE TORQUE CONTROL
PRECISE DEPTH OR HEIGHT CONTROL OF FASTENERS
GENEVA MOTION INDEX TABLES AND PARTS FEEDING

Machines designed and built by GARVIN BROTHERS are now being used by several automobile manufacturers and parts makers, manufacturers of aircraft and parts, appliance manufacturers, the electronics industry and locomotive builders.

PHONE: CEntral 3-2195

GARVIN BROTHERS Incorporated
19880 State Line Road South Bend 24, Ind.

Use postpaid card. Circle No. 255

SPECIAL RIVETS
like some of the samples shown here . . . or the more commonly used tubular and split rivets . . . they're all alike to the American Rivet Co. And always—our own special brand of quality and service that gets you what you want when you want it.
THE AMERICAN RIVET CO., Inc.
849 N. Kedzie Ave., Chicago 51, Ill.
Write for price list. For specials, send specifications for prices.
AMERICAN RIVETS
BUY AMERICAN Tubular and Split RIVETS

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Allen now manufactures its products in new plant on 32-acre site seven miles from Hartford, Conn.

million lbs. of bar and rod stock. The heat treatment departments feature new Holcroft units that harden, quench, wash and temper in continuous operation.

Walter Kidde Constructors, Inc., N.Y., was in charge of plant design and construction.

AEC OFFERS ENGINEERING DATA TO PUBLIC

The Atomic Energy Commission has placed the sale of some 10,000 engineering drawings, specifications, photographs, bills of materials, etc., concerned with various equipment, into the hands of three firms. Cooper-Trent Blueprint & Microfilm Corp., Arlington, Va., Rapid Blueprint Co., Los Angeles, Calif., University Microfilms, Inc., Ann Arbor, Mich.

The Technical Information Service Extension at Oak Ridge, Tenn., will send catalogs without charge.

P-K NAMES KAHN VICE-PRESIDENT

Parker-Kalon Div., General American Transportation Corp., Clifton, N.J., fastener manufacturer, announced the appointment of S. S. Kahn to vice president. Kahn, who has been general sales manager of Parker-Kalon since 1953, started with the company in 1928 as a technical sales correspondent. In 1932 he was appointed assistant sales, in 1941 field sales manager and in 1944 he was named sales manager.

HANDY & HARMAN ADDS TWO SALES POSTS

Two new sales posts added by Handy & Harman are a result of the company's entry into new markets with more diversified product lines. E. Earle Tietz, former industrial products manager, will be manager of marketing services and Robert E. Burke, field sales manager. Burke's position as New York district sales manager will be filled by Clark P. Zitzmann and William K. Honan has been appointed industrial products manager.

McCRERRY NEW MAC-IT SALES MANAGER

Mac-it Parts Co., with the appointment of George E. McCrerry as sales manager, has assumed direct sales control of its line of socket products. Offices will be in the main plant in Lancaster, Pa. McCrerry has been manager of the Mac-it division of Strong, Carlisle & Hammond, former national distributor, for six years. The Cleveland firm has been handling Mac-it products for 45 years and will continue to handle Northern Ohio.

SET UP WELDING INFORMATION CENTER

An information center has been established by the American Welding Society at its headquarters at 33 West 39th St., New York City, for the dissemination of welding news and information. It will service both press and industry, announces Fred L. Plummer, national secretary for the AWS.

FABRICATED PRODUCTS PROMOTE ENGINEERS

JELLISON

BLACK

Two fastening engineers have been promoted to administrative positions in the Fabricated Products Co. D. A. Black has been named sales manager, replacing P. J. Jellison who was promoted to assistant to the president. Jellison has designed many of the company's fasteners, including a toggle-type bolt assembly for the attachment of corrugated cement-asbestos sheets.

ASSOCIATED SPRING STAFF PROMOTIONS

The Associated Spring Corp. of Bristol, Conn., announces changes in the staff of its Research Center and the engineering organization of the Wallace Barnes Division.

In Research, Louis S. Scherff is now vibration engineer, Wallace M. Curtis, mechanical engineer, John R. Henstenburg, machine designer, Ronald R. Crooks, metallurgist.

John B. Beckwith is engineering manager and David E. Waite, chief product engineer at Wallace Barnes.

STANDARD SCREW NAMES NEW AGENT

Standard Screw Co. announces the appointment of Liberty Industrial Sales, Inc. as an authorized stocking agent for Standard's complete line of Stanscrew socket screw products. Selling only to industrial supply firms, Liberty services customers through warehouse facilities at its Los Angeles headquarters, 2010 East Seventh St. Since its founding in 1948, the company also has begun meeting distributor requirements through its San Francisco office at 52 Zoe St.

MEARS HANDLES PHEOLL CONSUMER SALES

Frank Mears, a 16-year veteran with Pheoll Mfg. Co., has been named consumer sales manager of the industrial fastener division. He will be in charge of all direct selling efforts of the division. Mears has served in various capacities with the firm, in both sales and engineering of special cold headed parts. He most recently managed the Indianapolis area.

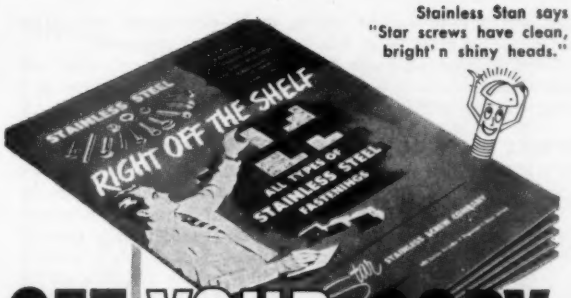
The company's headquarters are in Chicago.

PAPER SUGGESTS BRAZED HONEYCOMB USES

New ways of incorporating brazed honeycomb sandwich material into high speed aircraft and missiles were presented in a paper at the National Aeronautic Meeting of the Society of Automotive Engineers in Los Angeles.

"Practical Design Suggestions for Users of Brazed Honeycomb" points out the challenge in establishing new stress parameters and design criteria to take advantage of the

Stainless Stan says "Star screws have clean, bright'n shiny heads."



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- Machine Screws
- Nuts
- Set Socket
- Sheet Metal Screws
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STAINLESS STEEL
FASTENERS

Save time . . . save money. This book lists over 7,000 stainless steel fastenings available for immediate delivery RIGHT OFF THE SHELF®!

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CORROSION RESISTANT

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Direct Philadelphia phone: WAlnut 5-3660
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CABINET
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1. LOWER FIRST COST
Through Size Standardization.

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Through reduced heat losses.

Greater efficiency made possible by THESE FEATURES . . .
- 20% more insulation.
- No metal-to-metal contact.
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- Constructed for heavier loads and faster processing.

Designed to include the latest convenience features and safety devices.

Specialists in precise temperatures and programmed processing. We offer you engineering consultation on your oven requirements. Call or write.

Standard models to 1000° F
$110.50 and up
Immediate delivery
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high strength-to-weight ratios, multi-directional properties and inherent rigidity of this heat-resistant material.

Floyd F. Rechlin, Solar Aircraft project engineer, says that typical applications are now for the engine nacelles and wing trailing edges of supersonic aircraft.

SPOTZ NEW BORG-WARNER DIVISION CHIEF

Donald R. Spotz has been promoted from vice-president and general sales manager to president and general manager of Pesco Products and Wooster divisions of the Borg-Warner Corp., Chicago. Spotz will direct production in Wooster, Ohio, Burbank, Calif., and Hialeah, Fla. Employed with Thompson Products until 1955, Spotz has been serving Pesco as general manager for the aircraft product line. He succeeds R. A. Powley who resigned.

CONFAB TOPIC: ASSEMBLY PLANT UPKEEP

"Maintenance in Assembly Plants" will be the subject of one round-table session Jan. 27 at the tenth Plant Maintenance & Engineering Conference in Cleveland. "Arc Welding in Maintenance" will be discussed Jan. 26.

ILLINOIS TOOL SETS UP WEST COAST DIV.

Illinois Tool Works is calling its West Coast division the Calinoy Div., with offices and plant at 12917 Cerise Ave., Hawthorne, Calif. The headquarters for sales, engineering and manufacturing of fasteners for special purpose application in the missile and aviation industries will also house the district sales office for distribution of the Shakeproof and Fastex Div.

SOMMER NEW CLEARING VICE PRESIDENT

Gordon M. Sommer was named vice president in charge of engineering for Clearing Machine Corp., division of U. S. Industries, Inc. Sommer has been director of research and development at Clearing for the past two years. Prior to that, he was chief engineer at Clearing's Hamilton, Ohio plant. He spent several years with various engine manufacturers as a tool and die designer before his association with Clearing. Sommer has directed development of many advanced machines and components, including machine tools and military equipment.

CALABRESE HEADS GRIEVE-HENDRY SALES

New sales manager of Grieve-Hendry Co., Chicago, is P. J. Calabrese, formerly regional sales manager for Cramer Controls and industrial market specialist for Minneapolis-Honeywell Regulator. The University of Illinois graduate in mechanical engineering will have charge of sales and sales promotion. The firm makes industrial and laboratory ovens and furnaces.

TEST CHAMBER SIMULATES 200,000' HEIGHT

Altitudes up to 200,000 feet are simulated in a new environmental temperature altitude chamber which has been acquired by the New York Testing Laboratories, Inc., of New York City. The chamber is especially designed to test components that will go into the manufacture of space vehicles and missiles in connection with an overall reliability program designed to bring performance of components up to 100% efficiency under all possible conditions. Present efficiencies of 99.99% are not adequate, the laboratory reports.

CLEVELAND CAP TRANSFERS BLONSKA

Frank P. Blonska has been appointed sales manager, central states, for the Cleveland Cap Screw Co. Working out of Chicago warehouse, he will supervise sales representatives and be responsible for customer relations throughout 14 states. Blonska has been associated with the fastener industry for more than a quarter century, joining the Cleveland Cap Screw sales force in 1951. In 1956 he was assigned to the post of administrative assistant to the sales manager.

SPS FORMS NUCLEAR COMPONENTS DIVISION

To produce precision metal parts for the nuclear industries, Standard Pressed Steel Co. has formed the Nuclear Components Division at its Jenkintown, Pa., plant. The new division is an outgrowth of the Precision Stud Division set up in 1957.

Division manager will be Joseph P. Villo with Walter Hambrecht his assistant. Chief sales engineer is Harold Hafer, Sr. and Herman Benninghoff has been named supervisor of quality control.

For Engineered Answers
To Your Fastener
Requirements
ANCHOR Fasteners, Inc.
● FASTENER DESIGN & MASS PRODUCTION TO ORDER—For Automotive, Appliance, Electrical Furniture, Hardware & Other Volume Users
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CHICAGO FASTENER ASSOCIATION MEETS

More than 65 members and guests attended the November 17 meeting of the Chicago Bolt, Nut and Screw Association at the Conrad Hilton Hotel.

Guest speaker George Byrne Sr., of the Machine Screw Service Bureau, urged that more emphasis be placed on merchandising industry products. He suggested that a second look be taken at a successful merchandising ideas of leading companies in the industry.

Another guest speaker was George W. Cloos, senior economist of the research department of the Federal Reserve Bank of Chicago. Mr. Cloos stated that during 1958 the general price level actually moved down—contrary to public opinion. Professional economists would have discovered this, he pointed out, if they had used a broader base for studying business trends.

NEW THOMSON MIDWEST SALESMAN

New Indiana and Ohio sales representatives for the Electrical Contacts Div. of J. L. Thomson Mfg. Co. is Harry L. Huntsinger, former general sales manager of R.B.M., Div of Essex Wire. The past president of the Nat'l Assoc. of Relay Manufacturers will maintain offices in Logansport, Ind.

PITTSBURGH SCREW PLANS PRICING CHANGE

The Pittsburgh Screw and Bolt Co. is considering replacing its list and discount pricing system with a net price system, as well as replacing its freight variable on truck and carload quantities with a nationwide delivered price.

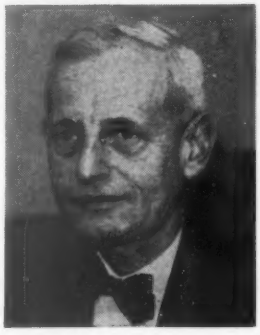
MELLOWES SETS UP NEWARK WAREHOUSE

The Mellowes Co. is aiming for overnight delivery on lock washer orders for customers with a 500 mile radius of the new Newark, N.J. warehouse, according to J. J. McCoy, general manager. The sales office is located in East Orange.

SISTO PROMOTED IN MIDLAND SCREW SALES

The promotion of Sam Sisto to assistant sales manager, inside sales, of Midland Screw Corp. was announced by Marshall Brayman, vice president and sales manager.

HULL HEADS METALCRAFT SALES



Samuel P. Hull, past president of the Pressed Metal Institute and most recently a director, vice president and sales manager of the Worcester Stamped Metal Co., has been named sales manager of the H. K. Metalcraft Mfg. Corp.

Mr. Hull, whose career includes sales experience with American Optical Co., Warner & Swasey and Canada Dry, was a member of the U. S. Dept. of Commerce Trade Mission to the Levante International Trade Fair, Bari, Italy in 1955.

HOBBS

TANGLE-PROOF

LOCK WASHERS

High in quality—low in cost. Available in high carbon steel, stainless steel, silicon and phosphor bronze, and all types of plating. "Tangle-proof" construction makes handling easier.

Write for complete details!

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Manufacturers of TANGLEPROOF Lock Washers

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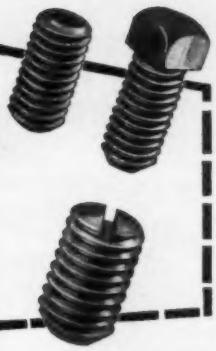
Set Screws *by the million*



. . . Moore makes them for all types of applications

Whatever you make that requires a set screw . . . standard or special . . . Moore can quickly and economically meet your requirements.

Moore Set Screws are precision made and quality controlled to assure exact uniformity. They fit into mass production assembly techniques; they are of proper hardness for long life; and they have accurate threads for secure locking action.

When more set screws are needed think of Moore. Prices are right and you get exceptionally fast delivery. Send for detailed price catalog.

Condensed Specifications			
	Headless Slotted	Square Head	Socket Head
Size dia.	#0 to ¾"	#6 to ⅜"	#4 to ⅜"
Lengths	1/16 to 3"	¾ to 2½"	⅛ to 1"
Points	cup, oval, round, flat, cone, dog		
Materials	steel, brass, bronze, stainless, aluminum, alloy steel, monel		

Special Heads — milled, slabbed, double slot, knurled.

Miniature Headless — #0, #1, #2, #3, #4 sizes in a wide selection of metals, finishes, lengths and points.

MOORE SET SCREWS

George W. Moore, Inc.
since 1880
91 Beaver St., Waltham 54, Mass.

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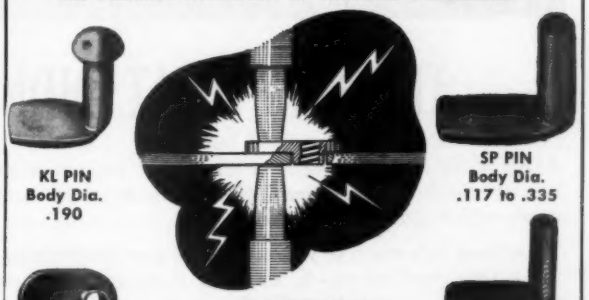
OHIO SPOT WELDING FASTENERS

THE PRIMARY FASTENERS IN FASTENER ASSEMBLIES



KL PIN Body Dia. .190

SP PIN Body Dia. .117 to .335

SN NUT Thread Sizes #6-32 to ⅜-16

ND NUT Thread Sizes #6-32 to ⅜-16

SS SCREW Thread Sizes #6-32 to ⅜-16

If you do spotwelding you can attach OHIO Spotweld Fasteners at the same time for faster, trouble-free assembly.

Samples and information furnished upon request.

The OHIO WELD FASTENERS Primary Fastener in Fastener Assemblies

THE OHIO NUT AND BOLT CO.
33 FIRST STREET BEREA, OHIO

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THE CITY THAT DIDN'T EXIST A MONTH AGO

Every 30 days the U. S. adds as many new Americans as live in Norfolk, Va.—creating brand-new wants and needs which must be satisfied.

What does this mean to you? It means greater opportunities than ever before—in all fields. Home construction is expected to double by 1975. Power companies plan to increase output 250% in the next 20 years to provide the power for scores of new labor-saving devices. Clothing suppliers predict a one-third increase in 7 years.

With 11,000 new citizen-consumers born every day, there's a new wave of opportunity coming.

7 BIG REASONS FOR CONFIDENCE IN AMERICA'S FUTURE

1. **More people** . . . Four million babies yearly. U. S. population has *doubled* in last 50 years! And our prosperity curve has always followed our population curve.
2. **More jobs** . . . Though employment in some areas has fallen off, there are *15 million* more jobs than in 1939—and there will be *22 million more* in 1975 than today.
3. **More income** . . . Family income after taxes is at an all-time high of $5300—is expected to pass $7000 by 1975.
4. **More production** . . . U. S. production *doubles* every 20 years. We will require millions more people to make, sell and distribute our products.
5. **More savings** . . . Individual savings are at highest level ever—*$340 billion*—a record amount available for spending.
6. **More research** . . . *$10 billion* spent each year will pay off in more jobs, better living, whole new industries.
7. **More needs** . . . In the next few years we will need *$500 billion* worth of schools, highways, homes, durable equipment. Meeting these needs will create new opportunities for everyone.

Add them up and you have the makings of another big upswing. Wise planners, builders and buyers will act *now* to get ready for it.

FREE! Send for this new 24-page illustrated booklet, "Your Great Future in a Growing America." Every American should know these facts. Drop a card today to: ADVERTISING COUNCIL, Box 10, Midtown Station, New York 18, N. Y.

(This space contributed as a public service by this magazine.)

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ONE LAST WORD

TRIM THE FAT, SAVE THE MUSCLE

The first laws of sound business management should be frugality and intelligent expenditures. A business in which the luxury of spending is viewed as a means of obtaining practical, beneficial results is a healthier operation than that business which carries about with it the dear pleasures of wasteful appropriations and extravagant expenditures regardless of maximum benefits derived therefrom.

When expenditures are to be made, the intelligent manager asks: Will it increase production? Will the job be done better? Will the product be improved? Will a dollar spent in this department show a saving in another? Will additional manpower really achieve our objectives faster? Will additional funds for research or service show a profit either from newly developed products or from higher sales?

When any of these questions are answered affirmatively the expenditure is approved. Frugality expects a just return from each investment: equipment is bought, production methods are streamlined, research programs are undertaken, new products are introduced, quality is improved, sales are increased, and a hard hitting, ambitious organization secures its place in the sun.

Frequently management will sit on its hands for months debating a worthy project. Then suddenly break loose in a grandiose manner, defying logic, counsel and sound principles and simply go overboard in a wasteful bath of expenditures. There is neither intelligent spending here nor a satisfactory result.

But what of the nickel and dime boys? Ah, you know them well: Frugality carried to absurdity. No expenditures for new equipment, instead a large maintenance crew to keep the old wrecks clanking another day; no well-paid managers, but only mediocre talent who stifle initiative and ambition; no funds for research, let the competitor do it; no experimenting with new methods, the old method is good enough.

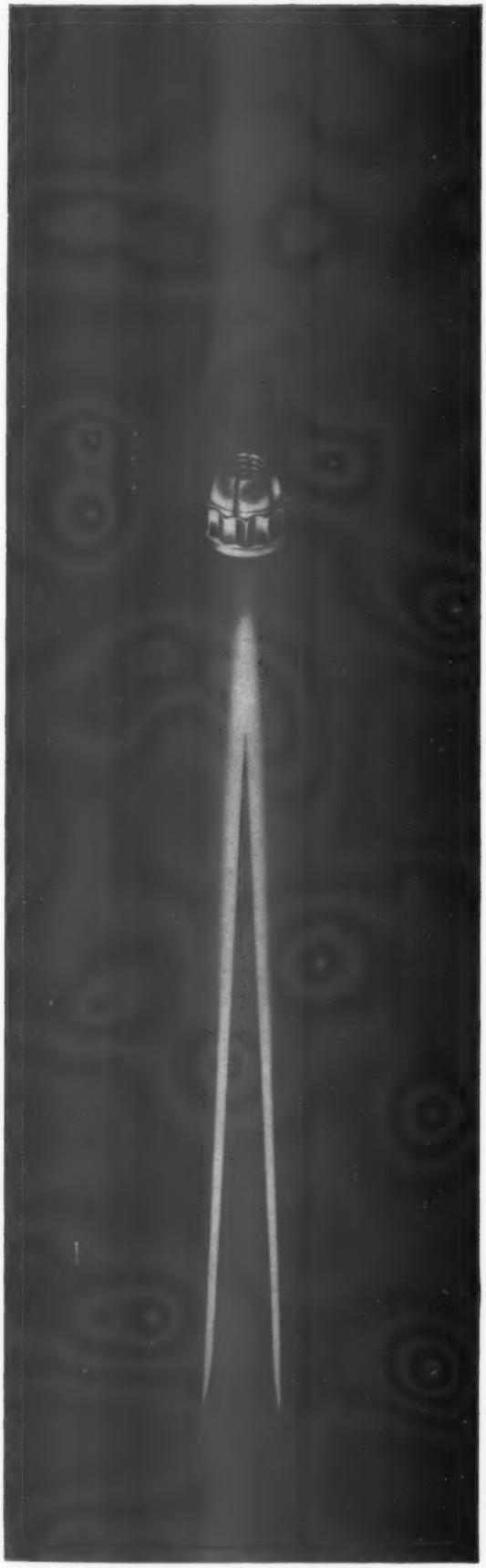
Our own fastener industry is one where frugality is carried to unbelievably ridiculous height. Get it as cheap as possible. Call in forty suppliers; save a mill here and save a mill there. Beat the supplier down another penny. This is considered good business; sound management thinking. The only trouble with this philosophy is merely this: for every penny saved at the point of purchase you spend a dollar at the point of assembly. Frugality is not a matter of saving a penny, it is instead a matter of spending three pennies at the outset and saving three dollars in the shop.

Penny pinching is a disease which spreads its poison into every vein and viscera of the body. It corrupts initiative, corrodes teamwork and causes dissension and disunity. It leads to product deterioration, sloppy work, makeshift practices and the result is a highly expensive, shabby product.

Let us have intelligent frugality. Send forth a dollar so that it may return, leading little dollars by the hand. A healthier, more profitable business will Result. Hack off the fat, yes, but save the muscle.

Wm. J. Schleicher

Vice President & Editorial Director



1400°F—BOOTS BUILDS NUTS FOR CHERRY-RED TEMPERATURES!

Working hand-in-hand with modern metallurgy, Boots currently manufactures a super alloy A-286 series designed to be effective at ultra high temperatures in the 1300°F range. Now, in answer to new engine developments, this temperature range has been further increased by using M-252 material to 1400°F—in the near future materials and parts will be available for 1500°F requirements.

Boots—new self-locking ultra high temperature series

12 POINT STAR LOK: (shown at left) Fabricated in both low and hi-beam configurations for standard and .003″ reduced P.D. bolts with the popular, spread-load hanging thread feature for greater high temperature fatigue resistance.

HEXAGON JET LOK: Utilizing the long-proven slotted beam principle in both standard and hi-beam configurations for standard and .003″ reduced bolts.

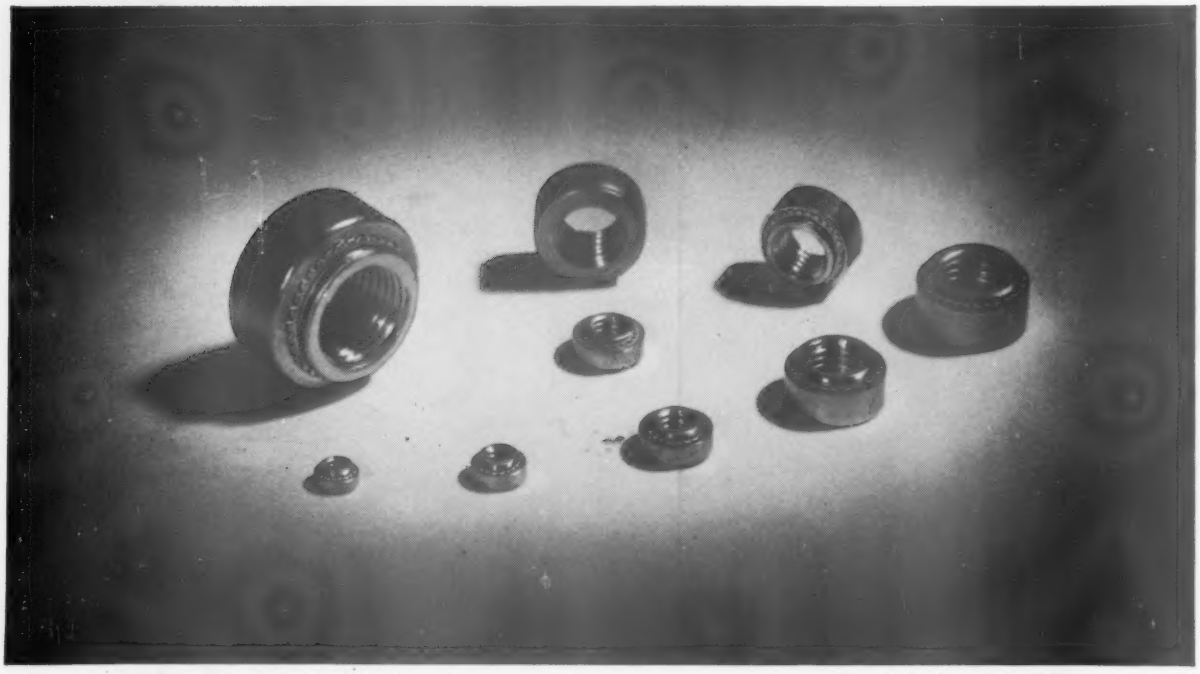
LIFE LOK: Newest Boots product . . . with revolutionary new stress-relieved locking feature, designed to achieve the ultimate in light weight-low silhouette configuration for fixed and floating anchor nut and gang channel applications. Unique out-of-round normalization — through use of stress-relieving cutaways at each ellipse apex — is the secret of LIFE LOK's exceptionally long re-usability at ultra high temperatures.

Patents Applied For

BOOTS

AIRCRAFT NUT CORPORATION

NORWALK, CONNECTICUT



New SPS Swage Nuts can be installed quickly and easily in a wide range of sheet metals, including steel, without use of special tools or dies. They provide handy tapped holes in thin-section assemblies, aid in blind fastening.

New SPS Swage Nuts simplify problem of putting load-bearing threads in sheet metal

SPS Swage Nuts offer you a fast, economical means of putting load-bearing threads in thin metal. Unlike similar fasteners, they require no special tools, can be installed with a press fitted with flat dies. Further, they do not discolor, deform or buckle the metal in which they are mounted. And they do not project from the opposite side of the plate, a design advantage where minimum clearances are involved.

Push-out and torque-out values of SPS Swage Nuts are the highest available for fasteners of this type. This insures proper torquing of screws and increases reliability under working loads and vibration.

SPS Swage Nuts can be used in metal with a hardness up to approximately Rockwell C25. This is an advantage over comparable fasteners, because it includes steel, as well as the usual alloys of copper, Monel or aluminum. Swage nuts are available in sizes #2 through ½ in. (2B threads), with shank lengths for plate from .020 to .250 in. thick. For complete information, write for new Swage Nut bulletin (Form 2447) and samples. Aircraft/Missiles Division, STANDARD PRESSED STEEL Co., Jenkintown 78, Pa.

Step 1. Enlarged cross-section shows #8-32 SPS Swage Nut inserted in hole ready for swaging into plate. Ordinary hydraulic or pneumatic presses—even portable rivet setters—serve satisfactorily as installation equipment.

Step 2. Pressure displaces metal around edge of hole, forcing it into retaining groove. Swage ring knurls increase resistance to torque-out, also provide relief for metal flow. Note smooth surface on bottom of plate.

HIGH RELIABILITY

SPS research is continually developing fasteners with higher standards of predictable performance. By installing SPS high-reliability fasteners in your assemblies, you increase overall product reliability.

For more information on the full meaning of reliability, write for a copy of the new SPS booklet "High Reliability."

SPS **Jenkintown • Pennsylvania**

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